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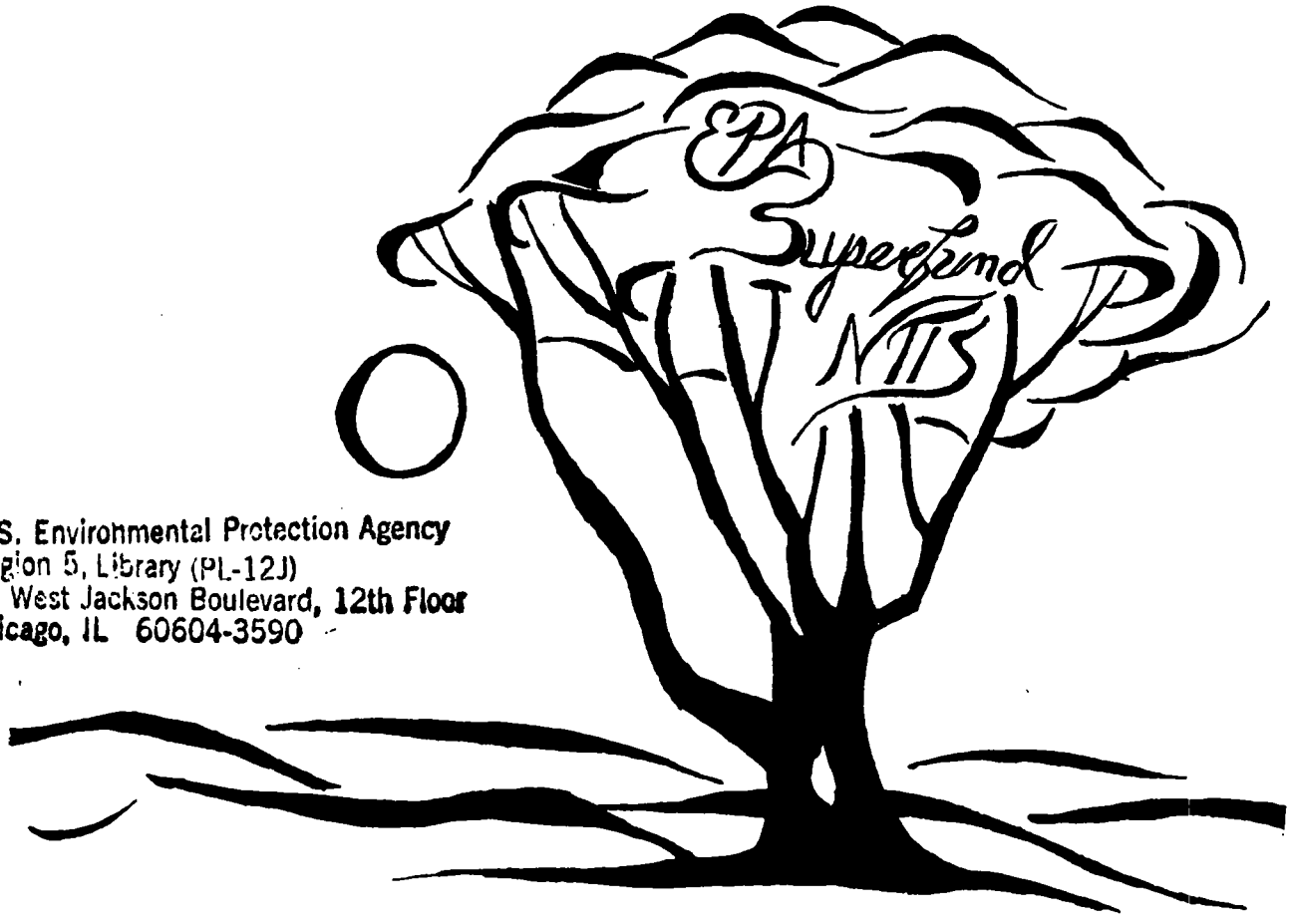
July 1995

EPA Superfund Record of Decision:

Waite Park Wells, OU1, 2, and 3, MN 7/14/94



DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Burlington Northern Car Shop Site
Waite Park, Stearns County, Minnesota

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Burlington Northern Car Shop site (Site) in Waite Park, Minnesota. The decision was chosen in accordance with Minnesota Environmental Response and Liability Act, Comprehensive Environmental Response, Compensation, and Liability Act., as amended by the Superfund Amendments Reauthorization Act and to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this Site.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, and the environment.

DESCRIPTION OF THE SELECTED REMEDY

This ROD presents the selected remedial action for three operable units for the Site. The first operable unit, OU1, addresses the remediation of former lagoons where liquid and solid wastes were disposed of, resulting in soil contamination. The second operable unit, OU2, addresses the remediation of contaminated sandblast sands. The selected remedy for both operable units will be stabilization/solidification and on-site containment.

The third operable Unit, OU3, addresses shallow ground water contamination. No response action will be taken for OU3 at this time. However, a ROD amendment may be necessary for OU3 in the future, if it is determined by ground water monitoring that ground water remediation is necessary. Once the material in the lagoons has been removed the threat of additional contaminants to the ground water will be removed. This may reduce the contaminant concentrations in the ground water so that ground water remediation may not be necessary. A ground water monitoring plan will be implemented after source removal is complete. If the concentrations of contaminants increase, remain the same, or do not meet regulatory levels specified in Table 2 to the ROD as a result of the source removal, the Minnesota Pollution Control Agency (MPCA) staff will evaluate whether ground water remediation is necessary. The MPCA staff will make its determination on ground water remediation within three years after removal of the source has occurred.

DECLARATION

The selected remedy is protective of human health and the environment, complies with state and federal requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The remedy selection process considered permanent solutions and alternative treatment technologies to the maximum extent practicable. This remedy satisfies the statutory preference for remedies that employ treatment which reduces toxicity, mobility, or volume as a principal element.

Because this remedy allows on-site containment of the stabilized and solidified waste, contaminated soil, and sandblast sands, continued ground water monitoring and operation and maintenance will be conducted in accordance with state and federal regulations. In addition, ground water monitoring will be used in determining whether ground water remediation will be required after removal of the source materials. A review of the ground water monitoring data will be conducted within three years after the removal of the source to determine whether ground water remediation is necessary. A review of the entire Site remedy will be conducted within five years after commencement of the remedial actions to ensure that the remedy continues to provide adequate protection of human health and the environment.

for Charles W. Williams
Commissioner
Minnesota Pollution Control Agency

July 14, 1994
Date

RECORD OF DECISION
DECISION SUMMARY
BURLINGTON NORTHERN CAR SHOP SITE
WAITE PARK, MINNESOTA

SITE NAME, LOCATION, AND DESCRIPTION

The Burlington Northern Car Shop site (Site) is located in Waite Park, Stearns County, Minnesota. The Site is rectangular in shape and includes approximately 200 acres of land in Section 8 and 9, T124N, R28W, of the SW/4 St. Cloud 15' Quadrangle. The location of the Site is shown in Figure 1.

The Site is located in the city of Waite Park (City) and the city of St. Cloud is djacent to the northern boundary of the Site. The Site is bounded on the north by the Electric Machinery (EM) site, an industrial park, and a trailer park; to the south by Third Street, then a residential neighborhood; to the east by residential homes and a commercial park; and to the west by the Sauk River. Tenth Avenue runs north-south through the Site and separates Area A from Areas B through H. The City municipal wells are located on the northeastern edge of the Site. The features on the Site and in the vicinity of the Site are shown in Figure 2.

The Site property and its surroundings are fairly flat. Most of the Site is vegetated. Large pieces of concrete, old rail yard parts, abandoned rail beds, and some heavy equipment are present on portions of the Site. Area A is partially wooded and public recreation facilities are located in the southern side of this area. Other structures noted on the Site are 7,000 cubic yards of stockpiled, fenced, and covered contaminated sandblast sand located at the east end of the Site in Area H. Four former waste lagoons, now covered with sandblast sand, debris and soil, containing approximately 17,500 cubic yards of contaminated material are present in Areas A and C.

The Sauk River forms the west property boundary and joins the Mississippi River approximately three miles to the northeast of the Site. The Mississippi River flows south through St. Cloud, Minnesota. Shallow ground water typically flows in the same direction as the surface drainage; therefore, the general ground water flow direction at the Site is in a northeasterly direction.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

In the early 1880's, the Great Northern Railroad purchased the Site to construct wooden box cars. A box car construction and repair shop was built in 1894 followed by a paint shop in 1896. Throughout the years, other types of railroad equipment were built and/or repaired on the Site. A steel shop was built in 1955 and new steel box cars were constructed on the Site until 1963. From 1963 to 1982 the steel shop was used to repair freight equipment. From 1950 to 1970, approximately 10,000 gallons of waste oil, paint, waste, and solvents were allegedly disposed of at the Site. In August of 1986, the Burlington Northern Railroad Company (BN) deeded a majority of the land and buildings to the City. Figure 2 shows the boundaries of the BN and City property. The City has sold some of the property and it is currently being used for industrial and commercial purposes.

In order to fully explain the history of the Minnesota Pollution Control Agency (MPCA) actions on the Site, it is necessary to discuss the history of the Waite Park Ground Water Contamination site. The Site, as well as the EM site, is part of the Waite Park Ground Water Contamination site. The Waite Park Ground Water Contamination site is listed on the U.S. Environmental Protection Agency's (EPA) National Priorities List (NPL) with a Hazard Ranking Score (HRS) of 32. Although the Site is considered a part of the Waite Park Ground Water Contamination site, it is listed separately on the state of Minnesota's Permanent List of Priorities (PLP) with an HRS score of 38.

In December 1984, volatile organic compounds (VOCs) were found in the City's municipal water supply wells. On January 28, 1985, the Minnesota Department of Health (MDH) informed the MPCA staff that the City was being advised to discontinue use of its water supply as soon as possible due to unacceptable levels of hazardous substances in its drinking water. Consequently on January 28, 1985, the MPCA Commissioner determined that an emergency existed with regard to the Waite Park water supply. The MPCA Commissioner issued a Determination of Emergency to allow use of the Minnesota Environmental Response and Compensation Fund to take necessary actions to provide the City with a safe drinking water supply and to undertake an investigation and Feasibility Study (FS) to determine the most appropriate long-term drinking water alternative. Initial provisions were made for a temporary supply of safe drinking water from nearby St. Cloud businesses, and on February 4, 1985, an emergency hookup between Waite Park and St. Cloud water systems was made to supply the City with safe water until the most appropriate long-term water supply system, selected through the conduct of an FS could be installed.

On October 22, 1985, after completion of an initial investigation and a Potential Responsible Party Search, the MPCA issued a Request for Response Action (RFRA) to BN, citing BN as a source of contamination of the City's water wells. On March 25 and September 26, 1986, the MPCA also issued RFRAs to Brown Boveri & Company Limited, Cooper Industries, Inc., Dresser Industries, Inc., and Electric Machinery Manufacturing (Responsible Parties) for the adjacent EM site, currently MEI International. The RFRAs also cited the EM site as a source of contamination of the City wells.

The RFRAs requested both BN and EM Responsible Parties to conduct a Remedial Investigation/Feasibility Study (RI/FS) and implement a Remedial Design/Response Action (RD/RA) Plan for a long-term water supply treatment system for the City. The RFRAs also requested BN and EM Responsible Parties to conduct an RI/FS and implement an RD/RA to address the contamination at their respective sites.

In September 1986, the MPCA staff approved the installation of an air stripping unit that would remove the contaminants from the City water supply. BN and EM Responsible Parties jointly implemented a water treatment system and the City wells were placed back into service in February 1988. This is the remedy that is currently in place, providing an acceptable long-term water supply to the City. The City, MDH, and the MPCA staff regularly monitor the water from the wells before and after treatment to ensure that the treatment system is functioning properly.

The EM site investigation has been completed and a Record of Decision (ROD), was issued on January 5, 1989. The remedy implemented at the EM site included the treatment of the shallow and deep aquifers by installing pump out wells, packed tower aeration treatment, and discharge of the treated water to the Sauk River. The MPCA staff will be conducting a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) five-year review in 1995 to determine if the implemented remedy is adequately addressing the contamination at the EM site. This five-year review will also include an evaluation of the Waite Park Water Supply treatment system.

Under the requirements of the RFRA, BN investigated and identified areas of contamination at the Site. Appendix I summarizes the reports submitted for the major investigative activities at the Site which are part of the Administrative Record. The investigations identified several areas that required remedial action. To remain consistent with these reports the Site is divided into eight parcels (Area A

through H) as shown in Figure 2. The following summarizes general areas of concern along with areas of concern associated with Areas A through H. Figure 3 presents the area of concern to be addressed by this ROD.

General.

Sandblast Sands: Paint containing high concentrations of lead was stripped from railroad cars at a sandblasting station located in Area H. Waste sandblast sand was spread throughout the Site and used as fill in holes and lagoons. Several investigations have been conducted to characterize and determine the extent of the sandblast sands. In 1991, BN removed one pile of sandblast sands present west of 10th Avenue and the City used the sand for a road bed underneath pavement. Although this pile did not contain levels of lead above the allowable levels in residential and playground areas, the pile was removed because of evidence of children playing in the pile and the possible exposure to lead. In 1992, the MDH began updating its public health assessment for the Waite Park Water Supply site, focusing on the BN portion. During the assessment, the MDH discovered that children frequently played in areas where lead contaminated sandblast sand was present. The MDH subsequently advised the MPCA that an imminent health hazard existed as a result of the contaminated sandblast sands at the Site. The MPCA notified BN of the imminent health hazard, and BN agreed to conduct an interim response action to remove the health hazard. In addition, the Agency for Toxic Substances and Disease Registry (ATSDR) funded free blood lead screening for the community which was conducted with MDH and Stearns County Community Health Services (ATSDR 1992). The interim response action consisted of BN undertaking a major effort in consolidation of the sandblast sands (BEI 1992). The sandblast sand consolidation effort began in the Spring of 1992 and was completed by the Summer of 1992. Sandblast sands, identified in all of the areas of the Site, were removed and consolidated on the east end of the Site in Area H. Approximately 7,000 cubic yards of sandblast sand were consolidated. The consolidated piles were covered with plastic and a fence with warning signs was placed around the piles. Sandblast sands located above the buried lagoons in Area A were not removed. Instead a fence was placed around the exposed sands and warning signs were posted. These sands will be removed as part of the lagoon remediation. In addition, the area of sandblast sands south and west of Area A lagoons were overlooked during the consolidation effort. Test trenches A1 through A4 (ERT 1988) indicate the depth of these sandblast sands as well as the presence of crushed barrels containing fibrous material that were disposed of along with the sands. This area will also be included in the remediation of the sandblast sands.

During the course of the investigations, sandblast sands were sampled and analyzed. The results of the analysis show that the sandblast sands contain elevated concentrations of lead, arsenic, and cadmium. The maximum concentrations detected were 17,000 mg/kg lead, 18 mg/kg arsenic, and 2.8 mg/kg cadmium. Table 1 shows the contaminants of concern (COCs) in the sandblast sands, the minimum and maximum concentrations detected as well as the remediation levels to be used for sandblast sand remediation. In addition, several samples analyzed for Toxicity Characteristic Leaching Procedure (TCLP) analysis show that the concentration of lead is above levels considered hazardous. Soil samples collected below the sandblast sands have shown that the metals have not leached out of the sandblast sands into the surrounding soils. In addition, there is no evidence to suggest that ground water has been impacted by the contaminated sandblast sands.

Petroleum Contaminated Soils: In March 1989, BN removed 13 underground and above ground storage tanks and 11 tanks from the basement of a building (JMA 1989). Contaminated soils encountered during the tank removal were excavated and stockpiled on concrete and covered with plastic in preparation for future treatment. Currently, all areas of the Site that are associated with soil and ground water contamination from former underground and above ground storage tanks are being

addressed under the MPCA's Tanks and Spills Section. In 1993, BN remediated the petroleum contaminated soils, approximately 15,000 cubic yards, by thermal treatment in accordance with the MPCA Tanks and Spills Section. According to the Tanks and Spills Section, all petroleum contaminated soil has been remediated; however, ground water has been contaminated in the vicinity of several of the former underground storage tanks. In addition, petroleum product floating on the ground water was detected in the area around aboveground storage tank OS8. The Tanks and Spills Section has required BN to conduct ground water monitoring to monitor the ground water quality and for free product to determine if ground water remedial actions are necessary.

Ground Water: Shallow ground water contamination has been noted in several of the areas listed below as well as the underground storage tank areas. In several areas of the Site, samples collected from monitoring wells indicate the presence of contamination. Some of the areas are not associated with source areas; however, continued ground water monitoring has indicated a trend in decreasing contaminant concentration. In most cases, the contaminant concentrations have decreased to below health based limits. The areas that have ground water contaminant concentrations at levels above health based limits are mentioned below.

In the deep aquifer, contamination has historically been limited to low concentrations of VOCs, with the highest levels recorded at monitoring well MPCA3d. This well is located between two City pumpout wells, and it is downgradient from the much larger VOC contamination problem at EM (100 times greater than at BN). Further, levels of total VOCs have declined steadily since monitoring began in 1985, to the point where most wells show nondetection for VOCs.

Miscellaneous: Large pieces of concrete, old railyard parts, railroad ties, old tank piping, abandoned rail beds, and some heavy equipment are present in portions of the Site providing physical hazards. The MPCA Solid Waste Section has indicated that storage of waste material and railroad ties is not in compliance with Minn. Rules part 7035.2855 Solid Waste Storage Standards. BN needs to properly disposed of this material.

Area A and C.

Lagoons: Historical aerial photographs show the presence of three lagoons west of 10th Avenue, in Area A, and one lagoon east of 10th Avenue, just north of 3rd Street, in Area C. An estimated 17,500 cubic yards of contaminated wastes are associated with the lagoons. The lagoons were used for the disposal of liquid waste (lubricating oils and greases, oils containing polychlorinated biphenols, cooking oils, solvents, and paints). Area C lagoon was also used for the disposal of calcium hydroxide, a lime sludge produced as a byproduct of acetylene production. Minor amounts of calcium hydroxide are also present in Area A lagoons. The lagoons were filled with soil, sandblast sands, metal scrap, slag, and hardened clumps of paint. In Area A lagoons, soil and sands were mounded on top of the lagoon. A tar like liquid can be seen seeping from the mound of soil. In 1989, BN sampled the tar seep and analysis indicated the presence of lead at 1,400 ppm and polychlorinated biphenols (PCBs) at 120 ppm (Wadsworth 1989). In November 1989, BN placed a fence around the tar seep area. In 1992, the fence was extended to include the exposed sandblast sands and warning signs were placed on the fence. The analytical results from samples collected from the waste in the lagoons and the soil contaminated by the lagoon waste detected elevated concentrations of PCBs, arsenic, cadmium, and lead. The maximum concentrations detected were 570 mg/kg PCBs, 42 mg/kg arsenic, 4.9 mg/kg cadmium, and 120,000 mg/kg lead. Although samples were not analyzed for semi-volatile organic compounds (SVOCs), SVOCs exist in the ground water and are expected to be in the waste and soils as well. Table 1 shows the COCs in the lagoons, the minimum and maximum concentrations detected, as well as the remediation levels to be used for remediation of the lagoons.

Shallow ground water in the vicinity of the lagoons has been contaminated above health based levels with PCBs, Volatile Organic Compounds (VOCs), SVOCs, and metals. An oil containing high levels of PCBs has also been detected on the ground water within the lagoon areas. Table 2 shows the COCs in the ground water and the minimum and maximum concentrations detected. Available data from ground water monitoring indicate that contaminants in the ground water in Area A have not reached the Sauk River. The ground water monitoring network in Area C is not adequate for determining if ground water has migrated under Tenth Avenue. Ground water monitoring wells to the north of Area C lagoon, in Area B, have not detected contaminant migration from the Area C lagoon.

Sauk River Sediment: The sediments in the Sauk River were sampled for PCBs upgradient, adjacent to, and downgradient of the Site. The results of the analysis have indicated the presence of PCB contamination at all sampling locations at roughly the same concentrations, indicating contamination of the sediment from possible multiple sources. Due to the lack of supporting information connecting PCB contamination to BN, the MPCA staff did not pursue this investigation further and will not require BN to remediate the river sediments.

General: Former car shop employees described operations in the southwest end of Area A where obsolete railroad cars were stripped and burned and where paint waste was buried. Some trenching, soil borings, and ground water sampling have been done in this area. Although the MPCA has received tips about buried waste in this area, very little has been found in the investigations or sampling other than the lagoons and buried sandblast sands south west of the lagoons. Some crushed barrels (both empty and oozing tar like substance) and sandblast sands were encountered during trenching (ERT 1988) in the vicinity of the lagoons. BN shall remove all barrels and sandblast sands associated with the lagoons as part of their remediation efforts.

Area B.

Buried Tank Car: The MPCA received tips about a buried tank car in this area. Extensive investigations, including electromagnetic induction sounding and trenching, were conducted to attempt to locate the buried tank car (ERT 1986, 1988). However, the buried tank car was not found in the investigations or sampling. Therefore, the MPCA staff did not pursue further investigation of this area.

Sulfur: Sulfur has been found on the ground surface east of 10th Avenue on the north side of the Site. Although the Sulfur is not a health hazard in the solid state, it is a fire hazard and the fumes from burning sulfur are a health hazard. BN shall either remove the sulfur or place clean soil over the sulfur to reduce the potential fire hazard.

Ground Water: Shallow ground water contamination above health based levels has been detected in monitoring well MPCA 14S. The contaminants in this well do not have a waste source associated with them. As indicated above, Table 2 shows the COCs in the ground water and the minimum and maximum concentrations detected. BN shall continue ground water monitoring in this area.

Area D.

Paint Building: Spray painting, stenciling, and reclamations operations were performed in this area. The 1986 RI Report (ERT 1986) reported elevated levels of metals in samples collected from the dirt floor of the paint building. On May 15, 1992, the current owner of the paint building, Waite Park Manufacturing Inc. (WPMI), collected samples and analyzed them for TCLP analysis. The results

indicated the dirt floor contained hazardous levels of lead. On June 2, 1993, the MPCA staff collected and analyzed soil, dust, and paint samples for lead. The results of the analysis showed that lead is above acceptable human health risk limits. On June 24, 1993, the Occupational Safety and Health Administration (OSHA) conducted an inspection of the paint building and collected soil, dust, and ponded surface water samples for lead and cadmium analysis. The analysis showed that lead and cadmium are above acceptable human health risk levels. The contaminant concentrations detected are shown in a footnote to the sandblast sands in Table 1. On September 3, 1993, OSHA issued a citation to WPMI for violations of the Minnesota OSHA standards. WPMI performed abatement as required by OSHA by October 4, 1993. The abatement consisted of securing access to the paint building, posting signs outside the paint building, and informing and training employees. The abatement did not include the removal of the contaminated material in the building and contaminated dirt from the floor of the building. WPMI has agreed to clean and remove the contaminated materials in the paint building so BN can remediate the dirt floor. BN shall include the contaminated dirt from the floor of the paint building with the remediation of the consolidated sandblast sands.

Area E and F and G.

The concerns in this area are associated with petroleum contamination. As indicated above, petroleum contamination is being addressed under the MPCA's Tanks and Spills program.

Area H.

Sandblasting Station: As indicated above, a sandblasting station was located in this area. Approximately 7,000 cubic yards of contaminated sandblast sands are consolidated in this area.

Paint Waste: The MPCA has received tips that paint waste was buried in this area in the 1960's. Only a small number of paint containers were found in one of 67 test trenches dug in the suspected burial area. Due to the lack of positive results and supporting information, the MPCA staff did not pursue this investigation further.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS and the Proposed Plan for the Site were released to the public for comment on May 3, 1994. These two documents were made available to the public in the administrative record at the MPCA, Saint Paul, Minnesota, office, Waite Park Community Library and an information repository maintained at the EPA Docket Room in Region V. The notice of availability for these two documents was published in the St. Cloud Times on May 2, 1994. A public comment period on the document was held from May 3, 1994, to June 2, 1994. In addition, a public meeting was held at McKinley Elementary School in Waite Park on May 18, 1994. Approximately 60 people attended the public meeting. At this meeting representatives from the MPCA staff presented an overview of the site history, answered questions about problems at the site, and discussed the remedial alternatives under consideration. A response to the comments received during the public comment period is included in the Responsiveness Summary, which is part of this ROD.

SCOPE AND ROLE OF OPERABLE UNIT

The Site History and Enforcement Activities section presented areas of contamination detected in the Site investigations. This section lists the areas that have been identified as areas of concern to be addressed as part of the remedial actions for the Site. The following are the operable units (OU) for this Site:

OUl: Lagoons (approximately 17,500 cubic yards of contaminated waste)
OU2: Sandblast Sand (includes 7,000 cubic yards of consolidated waste, the area south and east of Area A lagoons and the dirt floor of the paint building)
OU3: Shallow Ground Water

This ROD presents the selected remedial action for the three OUs. The contaminants present in the first two OUs pose the principal threat to human health and the environment because of the risks from possible ingestion and dermal contact with the soils, sandblast sands and oily wastes. Also, there is the continued threat of contaminant migration from the wastes into the underlying ground water, which is a source of drinking water for the City. The purpose of this response action is to prevent current or future exposure to the contaminated soils and to reduce the contaminant migration into the ground water. The soil remediation levels to be used in this response action are presented in Table 1.

The contaminants present in the third OU, shallow ground water, pose the principal threat to human health and the environment because of the risks from possible ingestion of the contaminated ground water. Ground water contaminants of concern are shown on Table 2. The removal of the source material in the lagoons will reduce the impact of contaminants to the ground water so that ground water remediation may not be necessary. Therefore, remediation levels have not been set for the ground water at this time and ground water remediation will not be addressed in this ROD. However, BN shall implement an MPCA staff approved ground water monitoring plan after source removal has been completed. Ground water samples shall be collected and analyzed in accordance with Table 2. If the concentrations of contaminants increase, remain the same, or do not meet regulatory levels as specified in Table 2 as a result of the removal, the MPCA staff will evaluate whether ground water remediation is necessary. The MPCA staff will make their determination on ground water remediation within three years after source removal is complete. If ground water remediation is determined to be necessary, the MPCA staff will prepare an addendum to this ROD describing the ground water remediation to be implemented.

SUMMARY OF SITE CHARACTERISTICS

This section summarizes the geology and hydrology of the Site as presented in the January 1994 Draft FS (ENRS 1994a) as modified by the MPCA staff and accepted as a Final FS. Please refer to this report for a detailed overview of the Site geology and hydrology.

The Site is underlain by Precambrian granite covered with a layer of glacial outwash and till that ranges in thickness from zero to more than 100 feet. The granite outcrops on the west end of the property. The overlying unconsolidated glacial deposits are interbedded with alluvium deposited by the Sauk River, bordering the west side of the property. The glacial deposits consist of fluvially deposited sand and gravel and fine-grained till deposited in a lacustrian environment.

Depending upon the location on the Site, there are up to five different layers of sand and gravel and fine-grained till consisting of silts and clays. Where five layers are found, the layers usually consist of three sand units interbedded with two till units. In general, across both the Site and adjacent EM site, a

single till unit separates an upper sand and gravel unit (Zone A) from a lower sand and gravel unit (Zone B). Zones A and B sand and gravel units are water bearing units. The glacial till forms the base of Zone A and generally acts as an aquitard, which limits flow into the underlying Zone B and acts as a barrier against the movement of contaminants between the upper and lower aquifers.

Zone A is continuous across the Site and interfingers with the Sauk River alluvium on the west side of the property. Zone A forms the near-surface formation within which any waste or spilled material from the surface or an underground storage tank will initially accumulate. Zone B is more complex than Zone A in that it interfingers with the glacial till unit, forming several interconnected tongues, and is absent in some locations. Zone B is an important aquifer in the area because it serves as a water supply source for the City and for many surrounding facilities.

Investigative data completed to date reveals two locations where the glacial till is not present. In one location, on the east side of the EM site, there is a "hole" through the glacial till where Zone A and Zone B are in direct contact allowing the aquifers to be hydraulically connected. The second location is in the south central portion of the Site. In this area data suggest that although there is no glacial till unit, Zone A sands lie directly on top of the granite bedrock and there is no connection between Zones A and B aquifers. Just south of the "hole" in the glacial till is an area where the surface of the glacial till is above the water table in Zone A. This mound impedes the northward flow of ground water in Zone A. This geology is illustrated in plan view and cross section on Figures 4 and 5.

The pumping of the City municipal wells has an immediate effect on Zone B wells. In addition, the pumping of the City municipal wells indirectly affects ground water flow in Zone A due to the "hole" in the glacial till. Ground water flow direction in the Zone A is generally north, from the Site, towards the EM site and the "hole" in the till (Figure 6). Ground water flow in the Zone B is northeast across the Site and is influenced by the municipal well pumping (Figure 7).

The upper sand unit soils have been contaminated as a result of the various wastes disposed of in the lagoons. Oily contamination from the lagoons has migrated into the surrounding soils due to its semiviscous state and by transportation via ground water migration. Analysis of waste and soil samples collected detected PCBs and metals above remediation goals (Table 1). Although SVOC soil contamination has not been documented due to lack of analysis, SVOCs are expected to be present in the soils because they have been detected in ground water samples collected in the vicinity of the lagoons. Sandblast sand and soil analysis indicate that contaminants from the sandblast sands have not migrated into the surrounding soils or the ground water. The analysis of sandblast sands indicate the presence of metals above remediation goals (Table 1).

Measurements taken in the Zone A ground water monitoring wells detected free product in the lagoon areas and analysis of ground water samples detected PCBs, VOCs, SVOCs, and metals above levels of concern (Table 2). The extent of ground water contamination appears to be localized to the lagoon areas. This is most likely due to relatively shallow gradient in the lagoon areas (Figure 5) and the hydrophobic characteristics of PCBs, PAHs and metals. Therefore, it appears that contaminated ground water has not significantly migrated away from the lagoons. However, the ground water monitoring network is not complete and will have to be upgraded as part of the ground water monitoring plan. The localized nature of contamination from the Site in the Zone A aquifer has not affected the City municipal well's ground water quality at this time. Trace amounts of VOC contamination have been detected in the Zone B aquifer. The concentration of VOCs has been decreasing over the past several years. However, if the VOCs are drawn into the municipal water wells they will be removed by the water treatment plant's air stripping unit.

SUMMARY OF SITE RISKS

In 1988, MDH conducted a Health Assessment (MDH 1988) of the Waite Park Ground Water Contamination site. Because data for the BN portion of the Waite Park Ground Water Contamination site were largely unavailable at that time, the assessment focused on the EM portion of the site, for which the investigation was nearly complete. The assessment identified the Site (as indicated previously, "Site" refers to the BN portion of the Waite Park Ground Water Contamination site) as a potential public health hazard. In September 1991, when additional data for the Site became available, MDH began a new health Assessment for the Site.

In November 1991, representatives from the ATSDR Lead Initiative program visited the Site. Their conclusions, presented in the ATSDR Lead Initiative Summary Report, September 24, 1992, (ATSDR, 1992) were that the Site may pose a potential health concern and recommended additional sampling and follow-up investigation to evaluate the potential for exposure to Site-related contaminants.

On March 25, 1992, MDH staff held an availability session and public meeting. MDH and MPCA staff distributed fact sheets to the citizens attending the meeting. Due to concerns about the public and children using some areas of the Site, where surficial deposits of lead contaminated sandblast sands were present exceeding soil guidelines established for residential or playground soils, the MDH informed the MPCA that it considered the Site an imminent health hazard. In response to this characterization by MDH, the MPCA requested BN to undertake emergency removal actions of lead contaminated sandblast sands. With the help of the Stearns County Community Health Services and staff from the City of St. Cloud, the MDH also informed the communities near the Site of the need to stay off the Site until the emergency actions have been completed.

MDH, in cooperation with ATSDR and the Stearns County Community Health Services, arranged for free blood-lead screening for residents living near the Site. This was not intended to be a study of community lead exposure or a mechanism for relating blood-lead or health concerns to any particular source of lead. Instead, the free screening was offered as a means to ensure that people had an opportunity to be screened for lead, because a source of high lead concentrations was known in the area, and that the cost of being tested elsewhere did not prevent them from following advice for routine screening. Because the individuals screened through this effort were self-selected by their own interest and motivation, the results of the screening program merely reflect the blood-lead status of the individuals tested at the time they were screened. Appendix II presents the statistical results of the blood lead screening. In summary, of the 108 persons screened, there were no elevated (>10 ug/dl) blood lead levels detected (MDH 1993).

On December 1, 1993, the MDH, in cooperation with ATSDR, completed a Public Health Assessment (MDH 1993) for the Waite Park Ground Water Contamination site that focused on the Site. The Assessment concluded that "Because available information indicates: 1) in the past, people may have been exposed to contaminants in surface soil; 2) physical hazards on the property pose a risk of accidental injury; 3) there are data gaps concerning contaminants which may have reached the Sauk River and can be taken up by fish and then eaten by humans; 4) there are data gaps regarding the air pathway; and 5) during past operations at the Site, workers were likely exposed to contaminated media, MDH considers the Site a public health hazard."

The Assessment also provided a summary of relevant exposure routes and toxicity of chemicals determined to be of potential public health concern. The chemicals evaluated were lead, arsenic, VOCs, petroleum products, polynuclear aromatic hydrocarbons (PAHs, a subset of SVOCs), and PCBs. The following is a brief summary:

Lead. Lead is the major contaminant in the sandblast sands. The relevant exposure route is dermal contact and ingestion. The end points of greatest concern from human health are hemoglobin synthesis and erythropoiesis, neurobehavioral deficits (central and peripheral nervous system effects on behavior, intelligence, and locomotion), cardiovascular toxicity (hypertension in adult males), and vitamin D metabolism and growth. Neurological symptoms have been observed in adult workers exposed to lead. In children, subtle neurobehavioral impairment (decreased learning ability and memory, IQ deficit, elevated hearing threshold) and growth retardation are associated with blood lead levels below those causing overt signs of lead poisoning. Lead has not been shown to cause cancer in humans, but is considered a probable human carcinogen based on animal studies.

Arsenic. Inorganic, water soluble arsenic compounds are readily absorbed (77 to 99 percent of administered dose) following ingestion. Distribution is to the liver, kidney, lung, spleen, skin, and hair. The primary effects produced by ingestion are nausea, vomiting, and diarrhea. Ingestion of high levels of arsenic have been reported to cause anemia, peripheral and central neuropathy, and damage to cells or function of the kidney, liver, and heart. Arsenic compounds can also irritate eyes, mucous membranes, and skin via inhalation and dermal contact. The EPA has designated arsenic a known human carcinogen via the oral route.

VOCs. Some of the VOCs found in area ground water or in past samples of the City municipal wells are considered to be carcinogenic or possibly carcinogenic. Trichloroethene and tetrachloroethane are not classified in terms of carcinogenic potential.

Petroleum Products. Inhalation and skin contact are the primary routes of exposure for petroleum products. Petroleum constituents with high volatility and low viscosity penetrate the lungs most deeply. Small amounts of inhaled product can lead to respiratory problems. In contrast, large quantities must be swallowed to produce symptoms. A range of symptoms is possible, including flushing of face, mental confusion, slurred speech, severe pulmonary toxicity, convulsions, coma, and respiratory or cardiac arrest.

PAHs. PAHs are a group of chemicals formed by combustion of coal, oil and gas, organic compounds, and garbage. Other common sources of PAHs include petroleum products (i.e. oils, creosote, gasoline, and tars), automobile exhaust, cigarette smoke, and grilled or charred foods. PAHs also result from natural sources and human exposure is common. PAHs can be absorbed well by skin lungs, and the gastrointestinal tract. Inhalation of particulates followed by absorption of bound PAHs is the principal route of human exposure. Inhalation of high levels of PAHs can produce headaches, nausea, and vomiting. Many PAHs are carcinogenic to animals and humans, including some of those detected in ground water samples collected from the Site.

PCBs. PCBs are a large group of related compounds. Because PCBs are persistent and pervasive, the general population is regularly exposed to very low-levels. Ingested PCBs are well absorbed (>90 percent) in the gastrointestinal system. Dermal absorption can occur from skin contact with PCB vapor, or dust, or surfaces to which PCBs are bound. Because PCBs bioaccumulate in the body, the level and duration of exposure are both important. Acute effects are typically mild, the most common symptoms being irritation of the skin (chloracne) and eyes, and nausea and vomiting. At high doses, liver damage, skin irritation, productive and developmental interference, immunosuppression, stomach

and thyroid alterations, and cancer have been observed. Based on evidence from animal studies, the EPA considers PCBs probable human carcinogens.

The MPCA and EPA staff agreed to allow BN to develop a draft Baseline Risk Assessment for the Site. The MPCA and EPA staff determined that BN's Risk Assessment did not meet the requirements of the EPA Risk Assessment Guidance for Superfund (EPA 1989). Therefore, with EPA approval, the MPCA staff developed remediation goals and presented them to BN in a September 10, 1993, letter. The remediation goals were developed based on available site data and the EPA Risk Assessment Guidance for Superfund (EPA 1989). The supporting documentation for developing the remediation goals is included in Appendix III. The MPCA staff has further refined the remediation goals to reflect Site characteristics and has developed the soil remediation levels presented in Table 1. Although there are currently human health and ecological risks associated with ground water, these risks are expected to decrease once source removal has occurred. Therefore, ground water remediation levels will not be developed unless ground water monitoring after source removal shows that ground water remediation is necessary. The ground water monitoring shall be conducted in accordance with Table 2. If ground water remediation is necessary, an amendment to this ROD will present ground water remediation levels. The following sections summarize the MPCA staff process used to develop the human health and ecological risk based soil remediation levels for the Site:

Human Health-Risks. The ground water and soil at the Site are contaminated with VOCs, SVOCs, PCBs, and metals. Table 1 and 2 identify COCs in each of these categories along with the minimum and maximum concentrations detected. Human health-based soil reference values (acceptable contaminant concentrations to remain on-site) were calculated for the soil COCs based on direct contact (i.e., incidental ingestion and dermal contact) to determine the acceptable risk levels to human health in current and future land use scenarios. The current and future land use scenarios were initially evaluated for unrestricted future land use, current and future recreational land use, and current and future commercial/industrial land use. The final evaluations as presented in Appendix III are based on unrestricted future land use and current and future limited land use (commercial/industrial land use). Health-based soil reference values were calculated for both of these scenarios.

For unrestricted future land use, a residential exposure scenario was utilized as a surrogate land use with the assumption that if it is safe for an individual to live on the Site, it will be safe for unrestricted human land use.

A worker and a trespasser were evaluated under the current and future commercial/industrial land use scenario. A commercial office worker would represent a low exposure scenario where as an industrial worker with outdoor activities would represent a higher exposure scenario. Therefore, the more conservative approach, an industrial worker with outdoor activities, was used in calculating the health-based soil reference values.

The exposure frequencies and durations for the respective scenarios are presented in Appendix III. The cancer potency factors (CPFs) and the reference doses (RfDs) for the contaminants of concern that have carcinogenic and noncarcinogenic effects were obtained from the October 1993 Integrated Risk Information System (IRIS) and 1993 Health Effects Assessment Summary Tables (HEAST) data bases. Under a fixed exposure scenario and specific target risk of IE-5, soil reference values were calculated. The calculated soil reference values were compared to the concentrations detected at the Site to determine the final COCs.

The CPFs have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of (mg/kg-day)-1, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPFs. Use of this approach makes underestimation of the actual cancer risk highly unlikely. CPFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

The RfDs have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

Excess lifetime cancer risks are determined by multiplying the intake level with the CPFs. These risks are probabilities that are generally expressed in scientific notation (e.g., 1x10-5 or 1E-5). An excess lifetime cancer risk of 1E-5 indicates that, as a plausible upper bound, an individual has a one in one hundred thousand chance of developing cancer as a result of site related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. For the purposes of this document, a HI was not generated due to the lack of contaminants effecting like target organs. Instead, an individual HQ of 0.2 (0.1 was used in Appendix III) was used to calculate the final soil reference values.

As indicated above, Table 1 identifies the *minimum* and *maximum* concentrations detected in the soils at the Site. The final soil reference values were used to set the soil remediation levels, also presented in Table 1. As shown in Table 1, there is a potential threat to human health in the unrestricted and commercial/industrial land use scenarios if remediation of the contaminated soil does not occur because the maximum contaminant concentrations exceed the remediation levels. In addition, as shown in Table 2, contaminant concentrations in the ground water have been detected at concentrations above the acceptable allowable limits for drinking water. As indicated previously, the contaminant concentrations are expected to decrease after source removal occurs. If source removal does not occur, there is a potential threat to human health by ingestion of contaminated ground water.

Environmental Risks. In addition to human health risks, the risks to the environment were also evaluated and used in the final determination of remediation levels. The soils pathway, through direct contact, soil ingestion or food chain transfer exposure routes, is of primary concern for terrestrial plant and animal species at the Site. Unfortunately, there are no soil criteria values and there is little information available regarding maximum allowable soil contamination levels for evaluating risk to terrestrial ecological receptors. The absence of tissue residue information for the Site also precluded

development of Site-specific bioaccumulation factors which would reflect the actual bioavailability of the COCs on the Site. Therefore, literature values were used to determine a best estimate of soil reference values that would be protective for most ecological receptors on the Site. In addition, a Site visit and evaluation was conducted to characterize the ecological resources of the area.

The Site is located in the North Central hardwoods ecoregion. The original presettlement vegetation in this area was predominantly oak woodland and brushland with scattered prairie openings, and floodplain forest (silver maple, elm, cottonwood, willow) along the river margins. The Site contains four distinct habitat types: the southern part of Area A is a recreational park containing mowed grass, baseball fields and a hockey area. Parkland is also present along Third Street in Areas C, D, and F; the area between Area A lagoons and the Sauk River consists of a mixture of river margin/floodplain forest and maple-basswood forest with many large trees and well-developed shrub understory. This area is relatively high quality habitat as indicated by the diversity of plant and wildlife species observed; north of the Area A lagoons is an area that was previously farmland and is now thick with ash and elm saplings forming a potential habitat for forest edge species and songbirds; the rest of the Site is old field habitat vegetated with grasses and forbs typical of disturbed soil. Rabbit and woodchuck dens as well as vole runways were observed inside the fence surrounding Area A lagoons. Well used trails are noted throughout the Site indicating substantial human traffic especially in Area A between the trailer park, north of the Site and the ball park.

The Site visit and evaluation concluded that no endangered species are known to occur in the vicinity, but two threatened species (bald eagle and loggerhead shrike) and several special concern animal species have been documented in Stearns County.

In summary, human health and ecological risks, current land use, and City zoning ordinances were used to determine acceptable future land use for the Site. The unrestricted land use remediation levels shall be applied to Area A while industrial/commercial remediation levels shall be applied to Areas B through H. Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to the public health, welfare, and the environment.

DESCRIPTION OF ALTERNATIVES

The January 1994 FS (ENSR, 1994a) and February 1994 FS Addendum (ENSR 1994b) identified and evaluated 10 response action alternatives and their combinations (Table 3) that could be used to address current or potential health and environmental threats at the Site. Five response action alternatives were evaluated for OU1: Lagoons and five for OU2: Sandblast Sands. For the purposes of this ROD, the two operable units and associated response action alternatives were combined to form five alternatives. The purpose for this is that most of the alternatives evaluated for the lagoons were also evaluated for sandblast sands. In addition, by combining the operable units there is an overall reduction in costs. The following alternatives were evaluated:

Alternative A: No Action. The no action alternative is considered at all Superfund Sites to provide a baseline comparison to the other alternatives considered. With respect to the no action alternative for the lagoons, no technical controls would be implemented other than the existing fencing around the Area A lagoons, thereby limiting access to the waste materials in this area. Inspection and maintenance of this fence over the long term would be necessary as well as continued ground water monitoring. The consolidated sandblast sands would remain on-site in their current location, covered to prevent movement from the pile. Maintenance of the cover and fencing around the pile would be required. Deed restrictions would be placed on the portions of the property where waste is present limiting

future activities including construction to prevent contact with waste materials. A ground water monitoring network would be installed or upgraded in the vicinity of the lagoons. A ground water monitoring plan would be developed to monitor ground water quality for the parameters listed in Table 2. Ground water remediation would be determined based on the ground water sampling and analysis results.

As indicated above in the Summary of Site Risks section, there is a potential threat to human health and the environment because the maximum concentration of contaminants on the Site exceeds the remediation levels as presented in Table 1. In addition, not all sandblast sands have restricted access. If the soil contamination is not addressed, human health and environmental exposure is likely. Therefore, the no action alternative is not acceptable because it is not protective of human health and the environment. In addition, no action for the lagoon is not practical in Area C because scheduled road construction includes the excavation of approximately one half of the Area C lagoon. Also, the no action alternative does not meet our objective of source removal to reduce contaminant concentrations in the ground water. Currently, contaminants are located in the saturated zone and therefore already in contact with the ground water. As a result, Alternative A does not comply with Applicable or Relevant and Appropriate Requirements (ARARs) (ARARs are listed in Appendix IV) that apply to ground water. Therefore, this alternative will not be considered further.

Alternative B: In-Place Containment of Lagoons and Reuse as Road Base/Solidification and Onsite Containment of Sandblast Sands. This alternative consists of containing the lagoon material in place to prevent potential direct contact with and continued leaching of contaminants to the ground water. This would be accomplished through the use of capping, deed restrictions, and fencing. The caps would reduce the permeability by covering the lagoon areas with an impermeable layer thereby reducing the leaching of contaminants into the ground water. This alternative also consists of incorporating the non-hazardous sandblast sand in road construction as base material for roads to be constructed in the City or surrounding areas. The hazardous portion of the sandblast sands would be solidified/stabilized to non-hazardous levels and placed in an on-site containment facility. This alternative also includes a ground water monitoring network as required in Alternative A.

Capping of the lagoon is not practical in Area C because scheduled road construction includes the excavation of approximately one half of the Area C lagoon. In addition, capping does not meet our objective of source removal to reduce contaminant concentrations in the ground water. Currently, contaminants are located in the saturated zone and therefore already in contact with the ground water. Although capping would prevent potential direct contact with the waste, the potential for ingestion of contaminated ground water exists. Therefore, capping is not acceptable because it is not protective of human health and the environment and does not comply with ARARs that apply to ground water. As a result, this portion of Alternative B will not be considered further.

Placing the non-hazardous sandblast sands below the road is essentially equal to constructing a concrete or asphalt cap over the sand, which limits the mobility of the lead by eliminating infiltration of precipitation. Although this portion of Alternative B has been used in the past, segregating the hazardous from non-hazardous sand blast sands may not be very effective. Therefore, this portion of Alternative B will not be considered further. Solidification/stabilization and on-site containment of sandblast sands are acceptable and are discussed in Alternatives C and D. Therefore, Alternative B will not be considered further.

Alternative C: Solidification/Stabilization and On-site Containment. This alliterative includes the excavation of lagoon waste, sandblast sands, and the contaminated dirt floor of the paint building (now a portion of the WPMI property), and incorporation of the consolidated sandblast sands. Excavation

of the contaminated waste would continue until analytical results of selected sidewall and bottom samples pass the remediation levels as specified in Table 1. Any visible oil in the excavations floating on the ground water would be removed by pumping or using sorbent pads. Excavations would be backfilled with clean fill, compacted, covered with topsoil, and seeded. The waste would then be solidified/stabilized. The purpose of solidification/stabilization is to reduce the concentration of contaminants to below hazardous waste levels as specified in Table 4 and to minimize the mobility of the contaminants in the waste material. Solidification/stabilization, while implemented as a single technology, actually consists of two processes. Solidification consists of entrapping materials in a solid matrix with a high structural integrity, thereby minimizing the potential for constituents to leach from the waste. Stabilization methods involve the use of materials that limit the solubility and thus, the bioavailability and mobility of waste constituents. Several Solidification/Stabilization techniques are available, depending on the type of contaminants. However, Portland and Pozzolana cements are the most widely used with thermoplastic resins and organic polymers less common due to their high costs. Treatability studies would be conducted to determine the most appropriate method to use. The treated waste would be placed in a containment facility constructed on-site in Area E in accordance with the Minn. Rules Chapter 7035 pt. 2815. Contingency action plans and post closure requirements would be conducted in accordance with Minn. Rules Chapter 7035 pt. 2615 and 2645. The facility design would include: 1) a liner system consisting of layers of synthetic material and/or clay and sand; 2) a leachate collection and detection system; 3) a cover system consisting of layers of synthetic material and/or clay and sand; 4) a ground water monitoring system; and 5) a gas collection system.

Deed restrictions would be placed on any area that is not remediated to unrestricted land use remediation levels and on the property containing the facility. This alternative also includes a ground water monitoring network as required in Alternative A.

Alternative D. Solidification/Stabilization and Off-Site Landfill. This alternative includes excavation, oil removal, backfilling, and solidification/stabilization of waste materials as described in Alternative C. Once the waste is solidified/stabilized to below hazardous levels the waste can be disposed of off-site at an industrial waste landfill. Treated waste would be transported to an industrial waste landfill in trucks.

Deed restrictions would be placed on any area that is not remediated to unrestricted land use remediation levels. This alternative also includes a ground water monitoring network as required in Alternative A.

Alternative E. Soil Washing/Extraction. This alternative includes excavation as described in Alternatives C and D. The excavated and consolidated material would go through a soil washing/extraction process consisting of a treatment train that includes three major steps:

-soil washing for volume reduction;
-acid extraction for lead removal; and
-solvent extraction for PCB and oil removal.

Soil washing is a water-based process for mechanically scrubbing soils. This process either dissolves or suspends the contaminants in a wash solution or concentrates them into a smaller volume of soil through particle size separation techniques. This process, conducted on the lagoon waste, is expected to be ineffective due to the various types of soils and waste materials present. However, this process has been shown to be effective on the sandblast sand. Wastewater may need to be treated before discharge for lead, PCBs, and oil contamination. Potentially hazardous wastewater treatment sludges would be generated.

Acid extraction removes the metals from the soils by a three stage process. The metal is first converted into a soluble salt, the soluble salt is then extracted with an acidic solution, and then the metal is removed from solution by precipitating or electrowinning. Calcium hydroxide present in a large volume of the lagoon waste is not expected to be compatible with an acid washing process. In addition, oily soils present in the lagoons are expected to reduce the success of acid leaching. Acid extraction has been proven to be effective on the sandblast sand. Large amounts of wastewater are generated through this process.

Solvent extraction for PCB removal includes several extraction steps to achieve the required percent recovery. Solvent extraction is conducted by mixing soils with the solvent. The solvent containing PCBs is then removed from the soil and separated into oil, water, and solvent fractions. Solvents can be regenerated for reuse. The constituents in the oil fraction then must be thermally or chemically destroyed.

A treatability study would have to be conducted to determine the most appropriate methods for treatment. Treated soils would be placed back into the excavations as they are treated. Once treatment is completed, the soil would be covered with six inches of topsoil and vegetated. Any remaining treatment residual would require treatment or disposal, including waste fractions not treated in the process, sludges, treatment solutions, wastewater, and activated carbon. This alternative also includes a ground water monitoring network as required in Alternative A.

As indicated above, the mixture of PCBs, oils, and lead in the lagoons makes the soil washing/extraction treatment of the lagoon waste not technically feasible. Solvent extraction would not be required for the sandblast sand, as no PCBs are present. Treatment of the sandblast sands is technically feasible; however, it has not been successful at all sandblast sand remediation sites. In addition, the cost of treating the sandblast sands is approximately double the cost of the second most expensive alternative evaluated; therefore, Alternative E will not be considered further.

SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

The following is a comparative analysis of the Alternatives based on nine evaluation criteria presented in the National Contingency Plan (NCP). These nine criteria are grouped into three categories: threshold criteria, primary balancing criteria, and modifying criteria. The criteria and the comparative analysis of alternatives are presented in the following sections and summarized on Table 5. As indicated above in the Description of Alternatives section, only two alternatives, Alternatives C and D, will be evaluated further.

A. Threshold Criteria. The threshold criteria include the first two criteria, which are: 1) overall protection of human health and the environment, and 2) compliance with ARARs. The ARARs used for the Site are based on the requirements of CERCLA and the NCP as adopted by EPA in March 1990, as well as state requirements under the Minnesota Environmental Response and Liability Act (MERLA). In addition, remediation of the Site shall adhere to criteria established in other Minnesota statutes and rules. As indicated above, Alternatives A and B did not meet the threshold Criteria of overall protection of human health and the environment and do not comply with ARARs. Therefore, Alternatives A and B were not evaluated further.

B. Primary Balancing Criteria. The five primary balancing criteria are: 1) long-term effectiveness and permanence; 2) reduction of toxicity, mobility, or volume through treatment; 3) short-term effectiveness; 4) implementability; and 5) cost. Of these, the first two, long-term effectiveness and permanence and reduction of toxicity, mobility, or volume through treatment, receive the most emphasis of the balancing criteria in evaluating remedial alternatives. Alternative E, as indicated above, was not technically feasible for the lagoon waste and as a result would not provide long term effectiveness and permanence. In addition, Alternative E is cost prohibitive. Therefore, Alternative E was not evaluated further.

C. Modifying Criteria. Two modifying criteria were used to evaluate Alternatives C and D: 1) community acceptance and 2) state acceptance. The analysis of community acceptance is based on the community comments to the Proposed Plan during the public comment period and at the public meeting. State acceptance is based on the position of the MPCA.

Alternatives C and D were evaluated using the Threshold, Primary Balancing, and Modifying Criteria. The following summarizes this evaluation:

Alternative C: Solidification/Stabilization and On-Site Containment.

Overall Protection of Human Health and the Environment. This alternative would protect human health and the environment, in both the short and long term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site. This would be achieved by excavating the contaminated material, treating the contaminated material by stabilizing/solidifying to significantly reduce the contaminant mobility and toxicity, and placing the stabilized/solidified waste in a permanent containment facility on-site, further reducing the mobility. Because the contaminants of concern would be immobilized and contained, potential risks would be minimized. Some potential risk exists for exposure to contaminants during excavation, handling and mixing, and containment on-site, but these risks would be controlled though effective engineering and implementation of the alternative. The remedial action objectives would be achieved by this alternative. The containment facility would be monitored in accordance with an approved ground water monitoring plan. A ground water monitoring plan would be implemented after removal of the contaminant source to determine whether ground water remediation is necessary.

Compliance with ARARs. Resource Conservation Recovery Act (RCRA) Land Disposal Restrictions (LDRs) would apply to the on-site placement of excavated untreated waste exceeding the TCLP regulatory limits for lead as well as PCBs exceeding 50 ppm. However, a Corrective Action Management Unit (CAMU) can be designated to allow the implementation of a response action that formerly would have been restricted by LDRs (40 CFR Parts 260, 264, 268, 270 and 271). Once the waste is treated by solidification/stabilization techniques, the waste can be disposed of in an on-site containment facility constructed to meet Minn. Rules Chapter 7035 pt. 2815, without triggering LDRs. Excavation, treatment, and construction would be implemented in a manner to keep fugitive dust emissions below federal and state air quality standards for particulate matter and lead. This alternative is expected to comply with ARARs associated with ground water by removing the contaminant source. However, ground water monitoring will be required and a review of the ground water monitoring data will be conducted after three years of data has been collected to determine if ground water remediation is necessary. If ground water remediation is necessary, an amendment to this ROD will be developed by the MPCA and implemented by BN.

Long-Term Effectiveness and Permanence. This criterion assesses the magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the completion of remedial activities and assesses the adequacy and reliability of controls such as containment systems and institutional controls that are necessary to manage treatment residuals and untreated waste. This alternative permanently removes soil contamination, thereby eliminating a continued source of contamination to the ground water. Therefore, no residual soil contamination will be left in place. Ground water monitoring would continue after source removal has been completed. If the concentrations of contaminants in the ground water increase, remain the same, or do not meet regulatory levels as specified in Table 2 as a result of the removal, the MPCA staff would evaluate whether ground water remediation is necessary.

Minimal potential risk would be associated with the solidified/stabilized soils placed in an on-site containment facility. No risk from direct contact would exist as the materials would be covered with a synthetic and/or clay cap, and the area would be fenced. Ground water monitoring wells located near the containment facility would be monitored to determine if any contaminants were leaching into shallow ground water. Eight years of ground water monitoring indicate that lead has only been detected twice, once above acceptable limits in drinking water; otherwise it is not present in ground water at levels that pose unacceptable risks. An even lower level of risk would be present after treatment and placement of the waste material into the containment facility. Regular maintenance of the cap and deed restrictions on the property would also enhance the long-term effectiveness of this alternative. A contingency plan and post closure requirements, in accordance with Minn. Rules Chapter 7035 pt. 2615 and 2645, would be developed in order to have a good response in the unlikely event a release occurs.

Reduction of Toxicity, Mobility or Volume Through Treatment. Contaminants of concern would undergo treatment by solidification/stabilization to reduce their mobility and toxicity, such that the contaminated material would no longer be characteristically hazardous. The treatment of the soils is designed to be irreversible. The mobility would also be reduced by placement in a secure containment facility on-site. The volume of contaminants would not be increased. However, the volume of waste once it has been treated will increase due to the addition of treatment reagents.

Short-Term Effectiveness. This criterion assesses any potential risks, including risks to the workers and community, associated with construction and implementation of the alternative up to the point where remedial action objectives are achieved. The remedial time frame is estimated at one year and includes the time required to excavate and treat the waste materials and construct the on-site containment facility.

Potential short-term risks to the community could result due to dust emissions during excavation and handling of the soils on-site. This risk would be controlled by proper design and implementation of the alternative, including dust control measures. Other potential effects on the community are the increased vehicle traffic from delivery of cement and other treatment agents to the Site. Access to the Site would be restricted to prevent potential contact by members of the community.

Potential risks to workers involved in implementation of the remedial action are also associated with the excavation and handling of contaminated soils. All workers on-site would be required to be certified in hazardous materials safety training and to comply with procedures included in a site health and safety plan.

Minimal impacts to the environment are expected during the implementation of this alternative. Potential runoff from temporarily stockpiled waste materials on-site would be prevented and controlled by placing the stockpiled material in a lined, covered, and bermed area.

Implementability. Excavation of contaminated materials in the vicinity of 10th Avenue would require coordination with the Steams County Highway Department for rerouting of traffic. Solidification/stabilization is a common treatment technology for lead that has been successfully implemented at other Superfund sites. Stabilization agents for organics also have been used successfully at other sites. Mixing of oily soils with non-oily soils will provide a more homogeneous soil with a lower overall oil content that can be treated effectively. Solidification will act to bind the oils and PCBs in the treated matrix. Treatability studies would be conducted to determine the proper mixture of the appropriate treatment reagents. Ground water monitoring wells would be used to monitor potential leaching of contaminants to ground water once the waste has been solidified/stabilized and placed in the containment facility.

Cost. The MPCA staff developed estimated costs that exceeded BN's estimated costs for this alternative as presented in the Proposed plan. However, BN has provided additional information and the MPCA staff have reevaluated the costs for this alternative and determined that BN's costs as presented in the FS Addendum are appropriate. Therefore, the total cost for this alternative, including long-term operation and maintenance, is $2,800,000.

State Acceptance. This alternative is acceptable to the State since it allows compliance with state and federal statutes and rules and meets the nine evaluation criteria for remedy selection.

Community Acceptance. This alternative is acceptable to the Community. Please refer to the responsiveness summary for the community comments on the proposed plan.

<u>Alternative D: Solidification/Stabilization and Off-Site Landfill</u>.

Overall Protection of Human Health and the Environment. This alternative would protect human health and the environment, in both the short and long term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site. This would be achieved by removing the contaminated material, treating the contaminated material by stabilizing/solidifying to significantly reduce the contaminant mobility and toxicity, and disposing of the treated waste in an industrial waste landfill. Because the treated waste would be disposed of off-site, potential risks would be eliminated. Some potential risk exists for exposure to contaminants during excavation, handling and mixing, and transportation for off-site disposal, but the on-site risks would be controlled though effective engineering and implementation of the alternative. The remedial action objectives would be achieved by this alternative. A ground water monitoring plan would be implemented after removal of the contaminant source to determine whether ground water remediation is necessary.

Compliance with ARARs. RCRA LDRs would apply to the on-site placement of excavated untreated waste exceeding the TCLP regulatory limits for lead as well as PCBs exceeding 50 ppm. However, a CAMU can be designated to allow the implementation of a response action that formerly would have been restricted by LDRs. Once the waste is treated by solidification/stabilization techniques the waste can be disposed of in an off-site industrial waste landfill, without triggering LDRs. Excavation, treatment, and construction would be implemented in a manner to keep fugitive dust emissions below federal and state air quality standards for particulate matter and lead. This alternative would also comply with ARARs associated with ground water by removing the contaminant source. However, ground water monitoring

would be required and a review of ground water monitoring data will be conducted after two to five years of data has been collected to determine if ground water remediation is necessary. If ground water remediation is necessary, an amendment to this ROD will be developed by the MPCA and implemented by BN.

Long-Term Effectiveness and Permanence. This criterion assesses the magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the completion of remedial activities and assesses the adequacy and reliability of controls such as containment systems and institutional controls that are necessary to manage treatment residuals and untreated waste. This alternative permanently removes soil contamination, thereby removing a continued source of contamination to the ground water. Therefore, no residual soil contamination will be left in place. Ground water monitoring would continue after source removal has been completed. If the concentrations of contaminants increase, remain the same, or do not meet regulatory levels as specified in Table 2 as a result of the removal, the MPCA staff will evaluate whether ground water remediation is necessary.

Reduction of Toxicity, Mobility or Volume Through Treatment. Contaminants of concern would undergo treatment by solidification/stabilization to reduce their mobility and toxicity. The treatment of the soils is designed to be irreversible. The mobility would also be reduced by placement in a secure industrial landfill off-site. The volume of contaminants would not be increased. However, the volume of waste once it has been treated will increase due to the addition of treatment reagents.

Short-Term Effectiveness. This criterion assesses any potential risks, including risks to the workers and community, associated with construction and implementation of the alternative up to the point where remedial action objectives are achieved. The remedial time frame is estimated at less than one year and includes the time required to excavate and treat the waste materials and dispose of them in an off-site industrial waste landfill.

Potential short-term risks to the community could result due to dust emissions during excavation and handling of the soils on-site. This risk would be controlled by proper design and implementation of the alternative, including dust control measures. Other potential effects on the community are the increased vehicle traffic from delivery of cement and other treatment agents to the Site and transportation of the treated material off-site. Access to the Site would be restricted during remediation to prevent potential contact by members of the community.

Potential risks to workers involved in implementation of the remedial action are also associated with the excavation and handling of contaminated soils. All workers on-site would be required to be certified in hazardous materials safety training and to comply with procedures included in a site health and safety plan.

Minimal impacts to the environment are expected during the implementation of this alternative. Potential runoff from temporarily stockpiled waste materials on-site would be prevented and controlled.

Implementability. Excavation of contaminated materials in the vicinity of 10th Avenue would require coordination with the Stearns County Highway Department for rerouting of traffic. Solidification/stabilization is a common treatment technology for lead that has been successfully implemented at other Superfund sites. Stabilization agents for organics also have been used successfully at other sites. Mixing of oily soils with non-oily soils will provide a more homogeneous soil with a lower overall oil content that can be treated effectively. Solidification will act to bind the

oils and PCBs in the treated matrix. Treatability studies would be conducted to determine the proper mixture of the appropriate treatment reagents.

Cost. The total cost for this alternative, including long-term operation and maintenance costs, would be $4,500,000.

State Acceptance. This alternative is acceptable to the state since it allows compliance with state and federal statutes and rules and meets the nine evaluation criteria for remedy selection. However, the cost of this alternative is significantly greater than Alternative C.

Community Acceptance. This alternative is acceptable to the Community. However, the community has indicated their preference for an on-site containment facility. Please refer to the responsiveness summary for the community comments on the proposed plan.

Summary of the Comparative Analysis of Alternatives.

Based on the Comparative Analysis of Alternatives, both Alternative C and D meet the nine evaluation criteria. However, Alternative C is lower in cost and the community has indicated its preference for an on-site containment facility. Therefore, the recommended remedial alternative for implementation at the Site is Alternative C: Solidification/Stabilization and On-site Containment.

SELECTED REMEDY

The selected remedial alternative for implementation at the Site is Alternative C: Solidification/Stabilization and On-site Containment as described above in the Description of Alternatives Section. BN shall implement this alternative in accordance with Exhibit C of the October 25, 1985, RFRA, and BN shall also follow the Minnesota generic RFRA guidelines for the development of RD/RA Plans as presented in Appendix IV. In addition, BN shall include the following in development and implementation of the remedial actions:

BN shall excavate the lagoon waste, sandblast sands, and the dirt floor of the WPMI paint building, and incorporate the consolidated sandblast sands. BN shall excavate contaminated waste until all visible oily soils and sandblast sands are removed. BN shall also remove and treat any visible oil floating on the ground water. BN shall also collect samples from the native soils on the sidewalls and bottom of the excavations and analyze the samples to determine if the native soils left in place pass the remediation levels as specified in Table 1. Area A shall be remediated to unrestricted land use levels, while Areas B through H shall be remediated to commercial/industrial land use levels. However, the MPCA staff believes that once all the sandblast sands and oily waste are removed, unrestricted land use will be achieved in all areas. Once the analytical results show that the concentration of contaminants in the native soils achieve the remediation levels, excavations shall be backfilled with clean fill, compacted, covered with topsoil, and seeded.

BN shall solidify/stabilize the waste to reduce the concentration of contaminants to below hazardous waste levels as specified in Table 4 and to minimize the mobility of the contaminants in the waste material. BN shall submit a treatability studies work plan for determining the most appropriate method for solidification/stabilization of the waste. Once the MPCA staff has approved the treatability study work plan, BN shall conduct treatability studies in accordance with that plan. BN shall submit a report on the results of the treatability studies for MPCA staff approval. BN shall solidify/stabilize the waste in accordance with an MPCA staff approved solidification/stabilization method.

The treated waste shall be placed in a containment facility constructed on-site in accordance with the Minn. Rules Chapter 7035 pt. 2815. The facility design shall include: 1) a liner system; 2) a leachate collection and detection system; 3) a cover system; 4) a ground water monitoring system; and 5) a gas collection system. Prior to placement of the treated waste, BN shall install a ground water monitoring system for long-term monitoring of the containment facility and collect at least one set of ground water samples for background evaluation. BN shall develop a contingency action plan and post-closure requirements in accordance with Minn. Rules Chapter 7035 pt. 2615 and 2645. BN shall submit an RA completion report that includes certified as built plans and specifications and construction documents.

BN shall submit a ground water monitoring plan that includes a monitoring program for the containment facility as well as upgrading the ground water monitoring network in the vicinity of the lagoons and monitoring well MPCA 14s.

Deed restrictions shall be placed on any area that is not remediated to unrestricted land use remediation levels and on the property containing the containment facility. BN shall develop proposed deed restriction language and shall be responsible for ensuring that an MPCA approved deed restriction is placed on appropriate properties.

STATUTORY DETERMINATIONS

Overall Protection of Public Health, Welfare, and the Environment. The selected remedy will provide protection of human health and the environment from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site. This will be achieved by removing the contaminated material, treating the contaminated material by stabilizing/solidifying to significantly reduce the contaminant mobility and toxicity, and placing the stabilized/solidified waste in a permanent containment facility on-site. Because the contaminants of concern will be excavated and treated and will be immobilized and contained, potential risks such as ingestion and dermal contact will be eliminated. The remedial action objective of source removal and remediation levels will be achieved by this alternative. The containment facility will be monitored in accordance with an approved ground water monitoring plan to ensure the containment facility is providing maximum protection. A ground water monitoring plan will be implemented after removal of the contaminant source to determine whether ground water remediation is necessary.

Compliance with Applicable and Relevant and Appropriate Requirements. The selected remedy will comply with the requirements of federal and state statutes and rules. The federal statutes that the remedy must be in compliance with include CERCLA and SARA, which added Section 121 to CERCLA to provide specific cleanup requirements. Federal ARARs that the remedy will satisfy include the NCP, to the extent practicable, as adopted by the EPA in March 1990. This remedy will also comply with Minnesota Statutes, including MERLA, Minn. Stat. § 115B (1992). A list of ARARs that the remedy will comply with are listed in Appendix IV.

Cost-Effectiveness. Except for the No Action Alternative and the Capping Alternative (Alternatives A and B), the selected remedy provides treatment for the least amount of cost as well as the lowest net present worth of all the alternatives evaluated, and is cost-effective in meeting the remediation objectives.

Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable. The selected remedy uses treatment technologies to the maximum extent practicable. The removal of contaminated material will provide a permanent reduction of a source of contamination to the ground water. The excavated soils will be treated by solidification/stabilization and placed in a permanent containment cell constructed on-site. The containment cell will confine the contaminants, providing additional protection against continued ground water contamination. If the MPCA staff determines that the performance monitoring data show that this alternative does not adequately address ground water contamination, BN shall implement a ground water treatment system as specified in an Addendum to this ROD. The MPCA staff will make the determination whether a treatment system is necessary three years after source removal is complete.

Preference for Treatment that Reduces Toxicity, Mobility, or Volume as a Principal Element. Contaminants of concern would undergo treatment by solidification/stabilization to reduce their mobility and toxicity. The treatment of the soils is designed to be irreversible. The mobility would also be reduced by placement of the solidified/stabilized waste in a on-site containment facility. The volume of contaminants would not be increased. However, the volume of waste once it has been treated will increase due to the addition of treatment reagents.

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RESPONSIVENESS SUMMARY FOR THE RECORD OF DECISION
Burlington Northern Car Shop Superfund Site
Waite Park, Stearns County, Minnesota

This community responsiveness summary documents community involvement during the Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan phases of the Superfund cleanup of the Burlington Northern Car Shop Superfund site (Site) in Waite Park, Minnesota. It documents the Minnesota Pollution Control Agency (MPCA) staff response to comments made by interested parties during the public comment period.

The RI/FS and the Proposed Plan for the Site were released to the public for comment on May 3, 1993. These two documents were made available to the public in the administrative record at the MPCA, Saint Paul, Minnesota, office, Waite Park Community Library and an information repository maintained at the U. S Environmental Protection Agency (EPA) Docket Room in Region V. The notice of availability for these two documents was published in the St. Cloud Times on May 2, 1994. A public comment period on the document was held from May 3, 1994, to June 2, 1994. In addition, a public meeting was held on at the McKinley Elementary School in Waite Park on May 18, 1994. Approximately 60 people attended the meeting. At this meeting, representatives from the MPCA staff presented an overview of the site history, answered questions about problems at the Site, and discussed the remedial alternatives under consideration. A response to the comments received during this period is included below.

Background on Community Involvement

The Site is located on industrial property on the northern border of the city of Waite Park (City), a smaller city of 5,248 residents adjacent to the much larger city of St. Cloud (population 49,376). Part of the City's distinctive character is directly related to its identity as a railroad town. The Great Northern Railroad and, later, the Burlington Northern Railroad Company (BN) employed many City residents over the years. Because so many local residents have lived, worked, or played on or near the Site, they have not felt particularly threatened by hazardous wastes located there. Several additional features related to the location of the Site play an important role in the complexity of community opinion. These include the following:

- The MPCA and the EPA see two distinctly different things when looking at the areas of contamination. EPA considers a larger area, consisting of the Site, Electric Machinery (EM) site, and Waite Park Municipal Wells, as one site, listed on the National Priority List (NPL) as the Waite Park Ground Water Contamination site. The MPCA sees three distinct state Superfund sites.

- The industrial area located on the Site contains Waite Park's municipal wells. In retrospect, an industrial area such as this is not the most suitable location for a municipal well field; however, the risks of such placement were not known when these wells were installed.

- The sediments in the Sauk River were sampled for PCBs upgradient, adjacent to, and downgradient of the Site. The results of the analysis have indicated the presence of PCB contamination at all sampling locations at roughly the same concentrations, indicating contamination of the sediments from possible multiple sources. Due to the lack of supporting information connecting PCB

contamination to BN, the MPCA staff did not pursue this investigation further and will not require BN to remediate the river sediments. However, Southeast Asian families, many of whom live in a St. Cloud trailer park close to the Site, fish in the river and consume the fish. Therefore, there is a community concern with the Sauk River.

- Industrial development in the St. Cloud area has overtaken the available locations for such activity. The land left unused over the years because of the contamination problems is prime development land. Many good developments have gone elsewhere, and inquiries about the Site are frequent.

- An important project for local development is the expansion of 10th Avenue, which runs through the Site. This project has been in the planning for years. However, work cannot go forward until one of the waste lagoons is cleaned up because a part of the new road would go through the lagoon.

- Despite the fact that the majority of the Site is zoned industrial, the Site has been used often as a play area for children. The west end of the Site includes ball fields within relatively close proximity to areas of contamination. Children from a nearby school, McKinley Elementary, cut across the Site or used it as a play area before an MDH advisory in 1992. Several families used the area to exercise their pets.

All of these complicating factors have made the community relations at the Site difficult over the past 10 or so years since the MPCA staff have worked on the Site.

The MPCA involvement with the Site began in December 1984, when volatile organic compounds (VOCs) were found in the City's municipal water supply wells. On January 28, 1985, the MDH informed the MPCA staff that the City was being advised to discontinue use of its water supply as soon as possible due to unacceptable levels of hazardous substances in its drinking water. Consequently on January 28, 1985, the MPCA Director determined that an emergency existed with regard to the Waite Park water supply. The MPCA Director issued a Determination of Emergency to allow use of the Minnesota Environmental Response and Compensation Fund to take necessary actions to provide the City with a safe drinking water supply and to undertake an investigation and Feasibility Study (FS) to determine the most appropriate long-term drinking water alternative. Initial provisions were made for temporary supply of safe drinking water from nearby St. Cloud businesses, and on February 4, 1985, an emergency hookup between Waite Park and St. Cloud water systems was made to supply the City with safe water until the most appropriate long-term water supply system, selected through the conduct of a FS, could be installed.

On October 22, 1985, after completion of an initial investigation and a Potential Responsible Party Search, the MPCA issued a Request for Response Action (RFRA) to BN citing BN as a source of contamination of the City's water wells. On March 25, 1986, and September 26, 1986, the MPCA also issued RFRAs to Brown Boveri & Company Limited, Cooper Industries, Inc., Dresser Industries, Inc., and Electric Machinery Manufacturing (Responsible Parties) for the adjacent EM site, currently MEI International. The RFRAs also cited the EM site as a source of contamination of the City wells.

The RFRAs requested both BN and EM Responsible Parties to conduct a RI/FS and implement a Remedial Design/Response Action (RD/RA) Plan for a long-term water supply treatment system

for the City. The RFRAs also requested BN and EM Responsible Parties to conduct an RI/FS and implement an RD/RA to address the contamination at their respective sites.

In September 1986, the MPCA staff approved the installation of an air stripping unit that would remove the contaminants from the municipal water supply. BN and EM Responsible Parties jointly implemented the ground water treatment system and the municipal wells were placed back into service in February 1988. This is the remedy that is currently in place, providing an acceptable long-term water supply to the City.

In 1992, the MDH began updating its public health assessment for the Waite Park Water Supply site, focusing on the BN portion. Between the discovery of the contaminated municipal wells and the 1992 health assessment, MDH had very little involvement in the Site. During the assessment, the MDH discovered that children frequently played in areas where lead contaminated sandblast sand was present. The MDH subsequently advised the MPCA that an imminent health hazard existed as a result of the contaminated sandblast sands at the Site. In addition, the MDH conducted a public meeting and availability session on March 25, 1993, and followed up by attending a public meeting held by the city of Waite Park on April 9, 1992. Citizens were concerned about the potential for their children to be exposed to lead contamination and about potential effects. In addition, they were concerned about the delay in addressing the Site problems.

In response, the MPCA staff notified BN of the imminent health hazard, and BN agreed to conduct an interim response action to remove the health hazard. The interim response action consisted of BN undertaking a major effort in consolidation, fencing and covering the sandblast sands. In addition, the Agency for Toxic Substances and Disease Registry (ATSDR) funded free blood lead screening for the community, which was conducted with assistance from the MDH and Stearns County Community Health Services.

The City council also passed a resolution creating the Waite Park Community Advisory Panel (WPCAP) to aid in achieving a number of both MPCA's and BN's major objectives. In addition, the once-a-month dialogue between MPCA and BN staff allowed the community members to become more sophisticated in their understanding of the complexity of environmental protection. It also allowed MPCA and BN staff to develop consistent relationships. During much of the discussion about the proposed cleanup plan, MPCA and BN staff have had an opportunity to ascertain community preferences. This helped MPCA staff understand the community's needs and priorities.

As indicated above, a public comment period on the proposed cleanup for the Site was held from May 3, 1994, to June 2, 1994. In addition, a public meeting was held at McKinley Elementary School on May 18, 1994. At this meeting representatives from the MPCA presented an overview of the site history, answered questions about problems at the Site, and discussed the remedial alternatives under consideration. Along with the citizens were a group of students from St. Cloud State University (SCSU) assigned to study the real-life issues involved at the Site. By participating in the public comment process, the students aired many environmentalist views. They also helped the City residents to see the Site from a different perspective, guaranteeing that all possible objections to the cleanup remedy were aired. A response to the comments received during this period is included below.

Public Comments and Responses

The comments received during the public meeting and comment period fell into several categories. General Superfund program issues, petroleum contamination issues, on-site containment cell issues, ground water issues, and miscellaneous issues. The comments received in each area are listed below along with the MPCA staff response.

General Superfund Program Issues

Comment: One resident wanted to make sure that the public would not be paying for the cleanup actions.

Response: The state and federal Superfund laws require those parties whose actions have resulted in releases of hazardous substances, pollutants or contaminants to pay for investigation and, if necessary, cleanup of sites where those releases pose a threat or potential threat to public health, welfare and the environment. BN has paid all investigation costs and will pay for the cost of cleaning up contaminants at the Site.

Comment: One resident was concerned about how proximity to a Superfund site would affect property values. He also wanted to know whether MPCA had calculated the effects of the Site on residential real estate.

Response: The MPCA staff did not investigate the impacts of the Site on residential housing prices because the state and federal Superfund laws do not require the MPCA staff to do so. The MPCA staff experiences with a wide range of sites indicate that there is no clear pattern seen in property values near Superfund sites. The only predictable occurrence is a dip in property values shortly after more inflammatory types of publicity. But longer term trends are very difficult to predict.

It is unlikely that the Site would have substantial impact on residential property values because the most affected area is an industrial zone. However, if any local residents who have been required to sell property (i.e., through a job transfer or other situation) have incurred a property value loss, the Harmful Substances Injury Compensation Board may reimburse residents for up to three-fourths of the loss.

Comment: Several residents commented that they approved of the cleanup plan and thought it should go forward immediately.

Response: Once a cleanup plan has been approved and established in the Site Record of Decision (ROD), the MPCA staff will proceed with Site cleanup and if possible expedite the process.

Comment: BN strongly disagrees with the MPCA's cost estimates for off-site disposal at an industrial landfill and on-site containment.

Response: Originally the MPCA staff and BN did disagree on the cost estimates. BN has since provided the MPCA staff with additional estimates for on-site containment that indicate BN's original estimation was correct. The MPCA staff still disagree with BN's estimate for off-site disposal. However, with the new estimated figures, it appears that on-site containment will cost less than off-site industrial landfill. In addition, the fact that the MPCA staff and BN have disagreed on the cost

estimates is unimportant. Whether the on-site containment option costs more or less than off-site landfilling, BN will still pay the bill.

Petroleum Contamination Issues

Comment: After the 1993 cleanup of petroleum contaminated soil on the Site, one resident saw an oily sheen on puddles on the property and was concerned that BN had not done a thorough enough job of cleaning up the petroleum.

Response: The cleanup of the petroleum contamination was completed under the supervision of the MPCA Tanks and Spills staff. These staff members, who are MPCA's most experienced in terms of petroleum contamination cleanups, approved the final result. Before they sign off on a cleanup, soil samples are taken from the sides and bottom of the excavation area and must be at acceptable levels.

Comment: SCSU students who visited the Site after the 1993 petroleum cleanup said they encountered strong petroleum odors in the area. They were concerned that adequate cleanup had not taken place.

Response: Creosote-covered railroad ties, piping and miscellaneous debris taken from the excavation and stockpiled in this area are a source of odor problems. BN has indicated that this material will be removed as part of the cleanup.

On-site Containment Cell Issues

Comment: Several community members wanted to know how big the containment cell would be and how much contaminated soil it would hold. They were skeptical about whether such a small containment cell could hold all of the wastes after they were solidified/stabilized.

Response: The proposed on-site containment cell is small, approximately one and one-half acres, or 20' x 360' x 150', about the size of a football field. It is being designed to contain more than the estimated 25,000 cubic yards of contaminated soil. (It could hold as much as 33,000, if additional wastes are discovered upon excavation.) However, it will not contain wastes brought from any other location.

Comment: One student expressed concern about the possibility of the containment cell leaking over time. He wanted to know whether the design characteristics were sufficient to prevent any contamination to ground water.

Response: The containment cell will be built to the specifications of the state's Solid Waste Rules and will be a state-of-the-art facility. However, no engineering design can be guaranteed to last into the indefinite future. That is why there are several factors of protection regarding the treatment of the waste, the design of the containment cell, and long-term monitoring requirements.

These protections include: 1) the wastes, lead and PCBs do not easily move from soil into the ground water; 2) the hazardous components will be solidified/stabilized so that they are even less able to leach from the cement-like substance that will contain them; 3) the containment cell cover will assure that 95 percent of the rain and snow falling on the containment cell will run off instead of going through the wastes; 4) a synthetic and clay liner will prevent any contaminants that may leach from reaching the

soils; 5) the clay beneath the synthetic liner will restrict movement of contaminants that might escape through the synthetic liner; 6) a leachate collection and monitoring system will be installed; 7) ground water monitoring wells will be installed around the containment cell to detect potential releases from the containment cell; and 8) EPA conducts a five-year review of all Superfund cleanups to assure that the actions are still protective of human health and the environment.

Comment: Two residents and the SCSU students strongly preferred off-site disposal of the contaminated waste as a means to assure the safety of the municipal water supply.

Response: The MPCA staff is confident that the design of the containment cell, along with the series of safety factors listed in the previous response, provide adequate protection for the City water supply.

Comment: The students commented that by storing the wastes, the MPCA was just postponing the problem of waste disposal for future generations. They felt that the on-site containment was not a good long-term solution.

Response: The oily wastes contain a diversity of different components, and no known form of soil washing can deal with these wastes effectively. Lead could feasibly be extracted from the sandblast sands, but the cost of this treatment is approximately double the cost of the second most expensive alternative evaluated. It is the MPCA's preference to reduce the toxicity, mobility or volume through treatment. Solidification/stabilization is a form of treatment where solidification consists of entrapping materials in a solid matrix with a high structural integrity, thereby minimizing the potential for constituents to leach from the waste, resulting in the reduction in mobility Stabilization involves the use of materials that limit the solubility and, thus, the bioavailability and mobility of waste constituents. The solidification/stabilization process will also reduce the toxicity to below hazardous waste levels. The volume of contaminants would not be increased. However, the volume of waste once it has been treated will increase due to the addition of treatment reagents.

Comment: One resident was concerned that on-site containment of the wastes would adversely affect development in the area.

Response: One of the MPCA's primary concerns with the on-site containment option was that it would prohibit use of the property upon which the containment was built and a certain amount of land around the perimeter of the facility. However, there are some realities about land use in the area that include: 1) the land prohibited from use belongs to BN, and there is no indication that BN would sell the property for development; 2) concerns among bankers, developers, buyers, and sellers of land about contamination would not necessarily be removed by the removal of the several known areas of contamination; 3) the majority of the affected community did not seem particularly concerned about the adverse effects a containment cell will have on development.

Comment: An SCSU student asked whether the liner and cover of the containment cell would be tested for strength or would be affected by heat or frost.

Response: The synthetic and clay material used to line and cover the containment cell is commonly and successfully used at landfills throughout Minnesota. It will be tested throughout the installation process. The MPCA staff is confident that the materials will hold up under Minnesota's challenging weather conditions.

Comment: An SCSU student asked what would happen if the containment cell liner leaked and how BN would repair the problem.

Response: As part of the containment cell requirements, BN is required to provide a contingency action plan to be implemented in the unlikely event that a release occurs. This plan will describe methods to be implemented in the event of a release. One possibility is BN could install a slurry wall around the containment cell to stop ground water migration towards the municipal wells and install a ground water pump out system and treat the ground water prior to disposal.

Comment: One resident wondered whether the material to build the containment cell would be taken from the City area or outside of the City.

Response: Some of the natural soil on Site may be used to cover the containment cell, but much of the materials come from off-site, possibly outside of the City area.

Comment: Several residents wanted to know what the on-site containment cell would look like, once completed. One additional resident wanted to know the projected height and slope of the containment cell.

Response: The containment cell would look like a gently-sloped hill. It would rise approximately 20 feet from the ground surface, but gradually enough to make it more of a pillow-like shape than a mound shape. The slope of the containment cell would be five-to-one.

Comment: One SCSU student commented on the comparative costs of the on-site containment cell and off-site industrial landfill. He commented that he felt off-site would be less expensive, as well as better environmentally.

Response: As indicated in a previous response, the MPCA staff and BN did disagree on the cost estimates for off-site industrial landfill and on-site containment cell. BN has since provided the MPCA staff with additional estimates for on-site containment cell that indicate BN's original estimation was correct. The MPCA staff still disagrees with BN's estimate for off-site industrial landfill. However, with the new estimated figures, it appears that on-site containment cell will cost less than off-site industrial landfill. With on-site containment and off-site industrial landfill comparable in environmental protection, the deciding factors became 1) BN's willingness to perform one remedy over the other without additional delay; and; 2) the expressed preferences of the community. BN maintained throughout the process an unwillingness to undertake any remedy except on-site containment. And the community preference was strongly in favor of the remedy which could be accomplished with no delay to the 10th Avenue construction. Therefore, the balance fell in favor of on-site containment.

Comment: One SCSU student expressed concern that the MPCA staff initially expressed a preference for off-site industrial landfill, but changed its opinion later for an undetermined reason. He wanted to know why the MPCA had backed off from its initial position.

Response: The MPCA did prefer off-site industrial landfill, but the following developments altered the agency's views: BN's commitment in writing to construct an on-site containment cell that complied with the state of Minnesota's Solid Waste Rules, BN's additional information on costs for an on-site containment cell, and discussions with MPCA Solid Waste Section engineers who believed that such a

facility could be constructed quickly and with environmental protection equal to the off-site remedy. Once these developments took place, MPCA staff formally selected on-site containment.

Ground Water Issues

Comment: Several residents wanted to know how quickly any contaminants leaking from the containment cell could move into the lower aquifer from which the municipal water supply is drawn.

Response: If contamination were to emerge from the containment cell's base, it would be collected by the leachate collection system and pumped out of the system by BN. If the collection system failed, a leak detection system, located below the leachate collection system, would trigger an alarm and warn BN that a release in the liner has occurred. If a release occurred, contamination would first come in contact with unsaturated sands and eventually reach ground water. Because the contaminants of concern (PAHs, Lead & PCBs) are hydrophobic they would very slowly dissolve into ground water. At this point the monitoring wells that are required to surround the containment cell would reveal the presence of contamination in ground water. BN would then be required to investigate and/or repair the facility to correct this problem.

Because of the design of the containment cell and its leachate collection system, the MPCA considers it unlikely that contamination will ever reach ground water. But, in order to ensure that the public health is safe-guarded, BN will be required to maintain this system for as long as the containment cell exists.

Comment: Representatives of Brown Boveri and Cooper Industries (responsible parties for the EM site) did not feel that BN had established an acceptable monitoring network for the ground water. They commented that the network on the northern boundary of the BN property was insufficient to determine whether there are any contaminants migrating from BN to the EM site.

Response: BN and the responsible parties for the adjoining EM site do not always agree on what constitutes adequate investigation of contamination problems. The MPCA staff has felt that the monitoring system was adequate for the determination of contaminant sources. However, the MPCA staff will be evaluating the long-term monitoring network to determine if the monitoring network on the north side of the Site is adequate. This evaluation may or may not indicate the need for additional monitoring wells to determine whether contaminants are migrating from one site to the other.

Comment: Representatives of the EM responsible parties also commented that BN's sampling program should include total petroleum hydrocarbons and aromatic hydrocarbons because EM's pump-out system does not remove some of the potential contaminants.

Response: Ground water monitoring will be required for BN boundary wells MPCA 3s & d, MPCA 13s & d, MPCA 14s & d, ERT 28s and ERT 29s, for both VOCs and PAHs. This follows the complete sampling of the BN site twice for PAH compounds. In contrast, very little is known about PAH contamination on the EM site. One sampling of two wells in the fall of 1992 revealed only that PAH contamination in wells EM35s and EM22d was below a Practical Quantitation Limit (PQL) of 10 ppb. This is at a level above the detection of most PAH compounds at the BN site and therefore is inconclusive. In order to develop this idea further, EM would have to agree to more analytical testing of ground water and effluent of the EM site.

Comment: The EM responsible parties also wondered what evidence the MPCA had to show that another hole in the till unit was not allowing a more direct route for contaminated shallow ground water to move to the deeper aquifer from which the municipal water supply is drawn.

Response: Ground water paths can be detected in two ways, either through direct geologic evidence from the placement of a boring in the "hole", or by studying the ground water flow directions from contour maps. Since there is no evidence that borings have intersected a hole south of the EM site, and since ground water flow in the surficial aquifer at the BN site is clearly towards the known hole directly east of the EM building, there is no evidence that a more direct ground water path exists.

Comment: BN commented that it was incorrect for MPCA to state that "residual VOCs are removed by the municipal well treatment plant." BN's comments implied that there are no VOCs migrating from BN's property to the municipal wells.

Response: While the MPCA staff believes that the investigation conducted by BN's consultants is adequate to characterize the major problems on the Site, it in no way guarantees that the Site is free of all additional contamination. Nor does it guarantee that every molecule of VOCs removed from the municipal water treatment system comes from EM alone. The MPCA stated, accurately, that any residual VOCs are removed by the municipal well treatment plant – no matter where such VOCs would be coming from, including the BN Site.

Comment: BN commented that there was no risk of leaching of materials in the lagoons to the ground water because lead and PCBs are insoluble; 20 years of exposure of the contaminants to ground water have not produced contamination; and there is no hydraulic connection between the upper and lower aquifers.

Response: Lagoon C - Though lead and PCBs have low solubilities, they have both been detected in ground water in wells constructed in the lagoon. These compounds have not been detected in other wells, but this is likely due to the lack of wells immediately downgradient of the lagoon. There is no evidence to support the statement that these compounds have not moved off-site. There is a fully documented hydraulic connection between the upper and lower aquifers just east of the EM building.

Lagoon A - Ground water flow in this region is controlled by the Sauk River and is perhaps best characterized as stagnant. There is little movement of contamination. There is no clear hydraulic connection between ground water in the vicinity of this lagoon and the lower aquifer.

<u>Miscellaneous Issues</u>

Comment: One SCSU student wanted to know if the land use for the Site's immediate area would always be industrial.

Response: The Site is situated in land zoned for industrial use and recreational use. Whether it would or could be changed in the future is a local matter and at this point the City has indicated that it has no intention of changing the zoning. However, the MPCA requires land use restrictions be applied to areas not remediated to unlimited land use.

Comment: The Stearns County Board commented that it is concerned about the completion of the 10th Avenue construction project and wants to make sure that the cleanup actions happen in time to allow that project to go forward.

Response: Once a cleanup plan has been approved and established in the Site Record of Decision (ROD), the MPCA staff will proceed with Site cleanup and if possible expedite the process. While the MPCA staff can't guarantee that actions will go forward in a timely manner, BN has publicly expressed its intention to complete the work on time and MPCA staff will provide all approvals as expeditiously as possible to make sure the appropriate work starts on time. The MPCA staff also has suggested to BN or Stearns County that they have the option of moving forward with an interim response action to make sure that 10th Avenue moves forward.

Comment: The Stearns County Board also commented that whatever decision was made on the cleanup plan that it be protective for public health and the environment.

Response: The recommended action protects public health and the environment.

Comment: BN commented that the MPCA's 's estimate that 10,000 gallons of oil, paint, and solvents were disposed of on Site is without substantiation, since there are no written records about disposal practices from that time.

Response: The American Heritage Dictionary defines the term "estimate" as: 1) to calculate approximately the extent or amount of; 2) to form an opinion about; and 3) a judgment based upon one's impressions; opinion. The MPCA staff estimate that 10,000 gallons of wastes were disposed of on Site came from discussions with former employees, information about past operations, and other information. Without written records from disposal practices at that time, any figures given by the MPCA staff or BN would be estimates.

Comment: BN commented that MPCA's characterization of the heavy metal contamination on-site was not accurate. Its preferred language would have been "a mixture of materials with low lead concentrations and some higher lead concentrations."

Response: While such distinctions might be meaningful to scientific and technical minds, they are not meaningful in publications directed at the general public. Also, it is unclear whether such a language replacement would be helpful even if appropriately explained. What BN believes to be "low lead concentrations" would not necessarily be what MPCA, EPA, or MDH would consider "low lead concentrations."

Comment: BN commented that the numerical standards set by MPCA do not represent health-based standards but "are more conservative standards selected by MPCA based on criteria other than the risk assessment process."

Response: The numerical standards set by the MPCA are based on both health and ecological risk. They were set in accordance with the EPA Risk Assessment Guidance for Superfund and in consultation with the EPA's and MDH's Health Risk Assessment staff and MPCA's risk assessment expert, who holds a Ph.D. in toxicology.

Comment: BN commented that it is unknown whether PCB oils were disposed of on the Site, and that the PCBs found in the lagoon could have been associated with other materials found in the lagoon.

Response: The PCBs detected in the oily lagoon wastes could have been associated with other materials found in the lagoon, although it is much more likely that there came from PCB oils disposed of on Site.

Comment: BN commented that a table should have been included showing average concentrations of on-site contaminants rather than minimum and maximum concentrations. BN representatives felt that MPCA information did not present a realistic perspective of the true risks associated with the Site.

Response: The MPCA staff give minimum and maximum concentrations of contaminants of concern detected on Site because this data is commonly requested by the public. Also, the MPCA staff does not have an accurate figure showing average concentrations on Site. The MPCA staff could only have provided the average concentrations of those samples taken, not of Site contaminants as a whole.

Comment: BN commented that the MPCA staff did not give sufficient credit to the company for its thorough investigation of rumors about a buried tank car on the property.

Response: Since the information about the buried tank care came from former BN employees and BN investigated the allegations at the MPCA's request, no particular kudos are in order for either the MPCA staff or BN. Both did their required duties.

Comment: BN does not believe that lead contaminated wastes pose an immediate health risk to Waite Park residents. The two foundations for this belief: that blood-lead testing performed by MDH found no levels above detection limits for lead and the sands are covered and fenced.

MPCA: The lead-contaminated wastes that are now consolidated, contained, and covered do not pose an immediate health risk to Waite Park residents. However, before these actions were taken at MPCA's request, the lead-contaminated soils did pose an immediate health risk to Waite Park residents. Substantial public health and medical documentation is available to support lead's adverse health effects, particularly on children. The MDH would be happy to provide a list of such scientifically conclusive documents or studies upon request.

The blood-lead testing performed by MDH (in cooperation with ATSDR and the Stearns County Health Department) found no lead levels above detection limits. However, none of the health agencies involved in this investigation concluded that exposure to this lead-contaminated soil was safe. Nor did they conclude that exposure to the wastes on-site caused no harm to Waite Park or St. Cloud residents. Blood lead levels vary depending upon how recent exposure has been to the lead source. Those residents who came in for the testing were not a scientific sample of the population. No other indicators of lead exposure or poisoning were evaluated. For BN to claim that the levels of lead found on the Site never posed an imminent health risk on the basis of the blood-lead testing is misleading in the extreme and directly contradicts the evidence of public health officials at the county, state, and federal level.

Comment: BN commented that the MPCA's initial preference for soil washing/lead extraction should have been eliminated from consideration not just by its cost but because it is technically unfeasible. BN claims that the technology would not work on BN wastes.

MPCA: The lead-extraction technology has been used successfully at sites in Minnesota, and the MPCA has requested responsible parties to evaluate it at sites where it might be practical. Although the soil washing is expected to be successful on the sandblast sands, soil washing is not expected to be successful on the lagoon wastes.

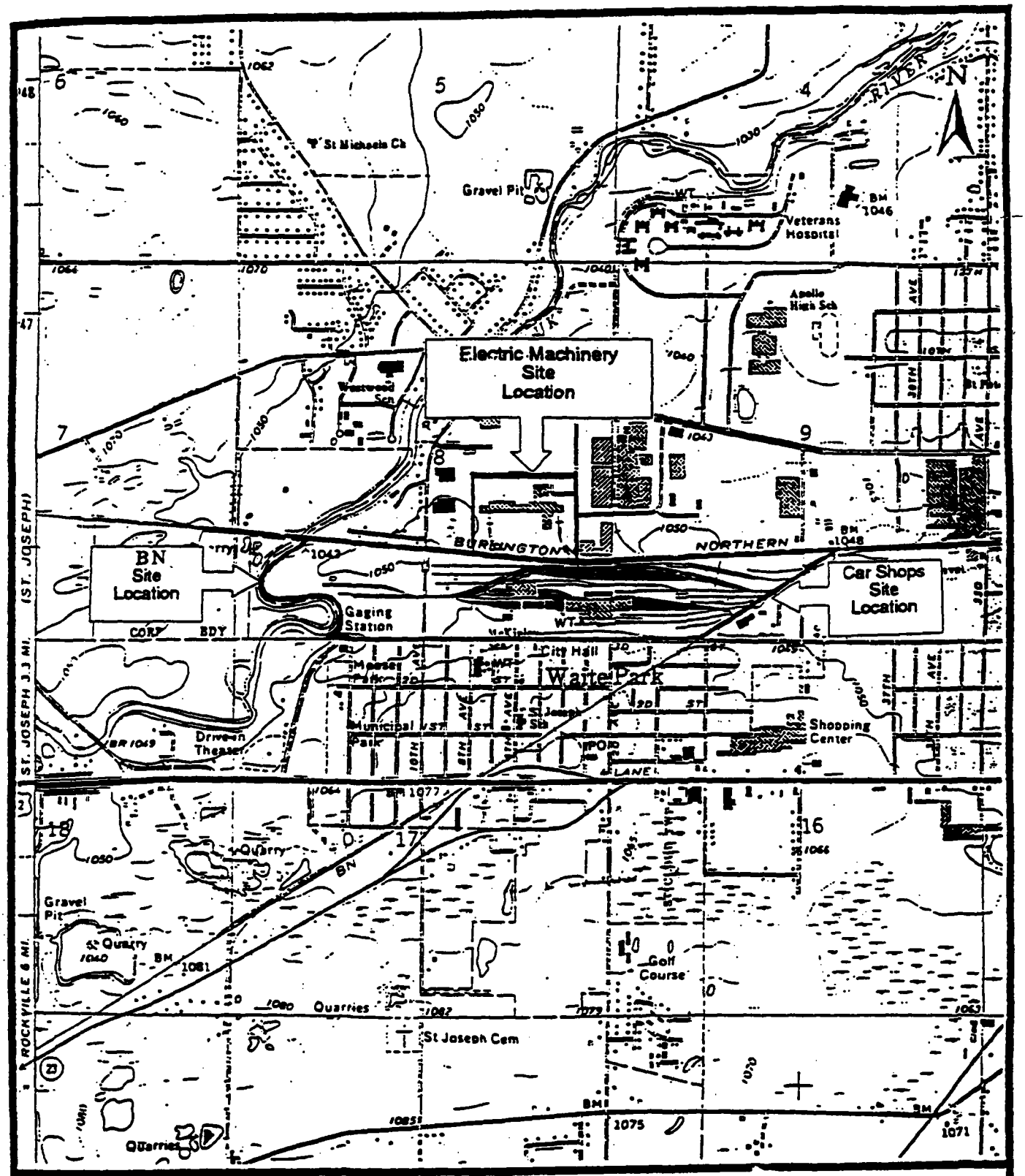
Summary

In summary, the most affected community members, consisting of Waite Park residents and public officials and businesses located on or near the property, approved of the cleanup recommendation. This group's primary message is best reflected by Mayor's Ringsmuth's final comment at the proposed plan public meeting: "Get the job done." As indicated in the above comments, once a cleanup plan has been approved and established in the Site ROD, the MPCA staff will proceed with Site cleanup and if possible expedite the process. While the MPCA staff can not guarantee that actions will go forward in a timely manner, BN has publicly expressed its intention to complete the work on time and MPCA staff will provide all approvals as expeditiously as possible to make sure the appropriate work starts on time.

The 10th Avenue project is of crucial importance to the community as a whole. While both BN and the MPCA staff have the best intentions of completing the requisite removal from the road-construction area on time, both regulator and regulated know that large remediation projects have glitches. Successful completion will require everyone's best efforts. The MPCA staff also have suggested to BN and Stearns County that they have the option of moving forward with an interim response action to make sure that 10th Avenue moves forward.

The SCSU students who commented at the public meeting oppose the cleanup recommendation and prefer off-site industrial landfill. The fact that the SCSU students are not the community directly affected by the Site does not alter the value of their participation. Their many questions and thorough study of technical documents allowed them to give affected community members another way to look at Site issues. They raised many of the concerns that agency staff discussed internally and guaranteed that all sides of the cleanup recommendation were examined.

Figures



Scale

1000 0 1000 2000 Feet

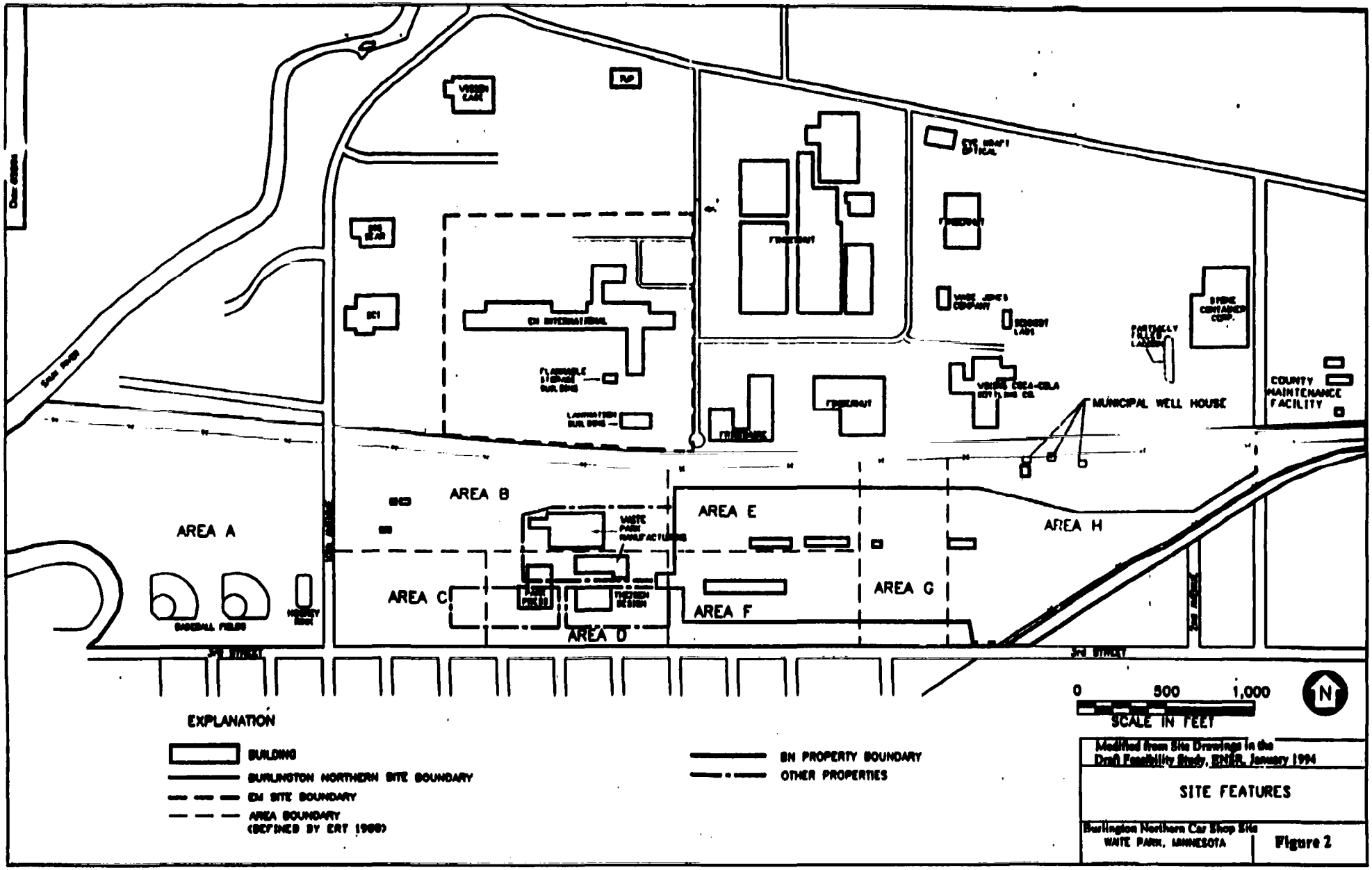
Quadrangle Location

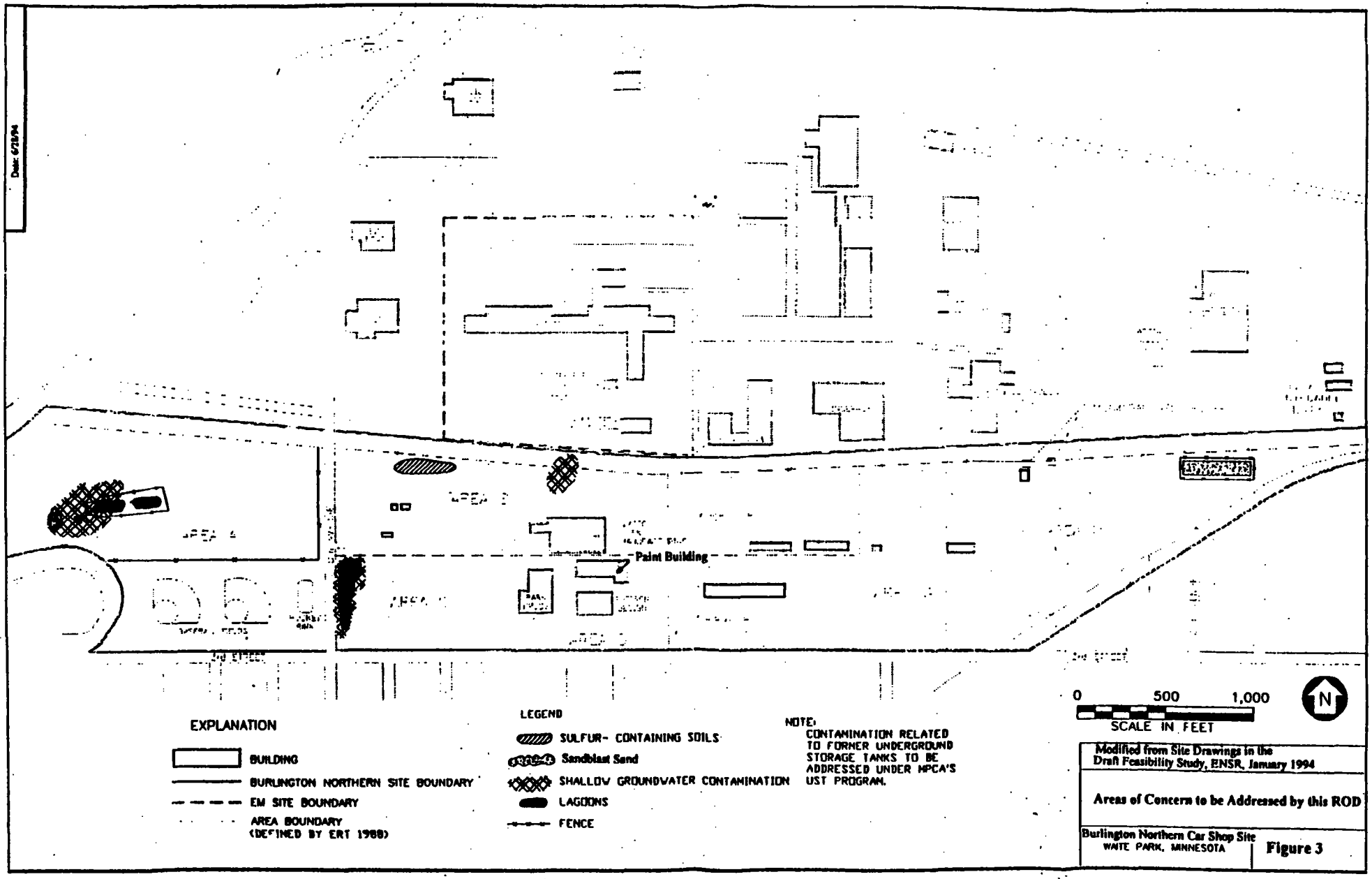
Source: U.S.Geological Survey, 1974, St. Cloud Quadrangle Map, 7.5 Minute Series.

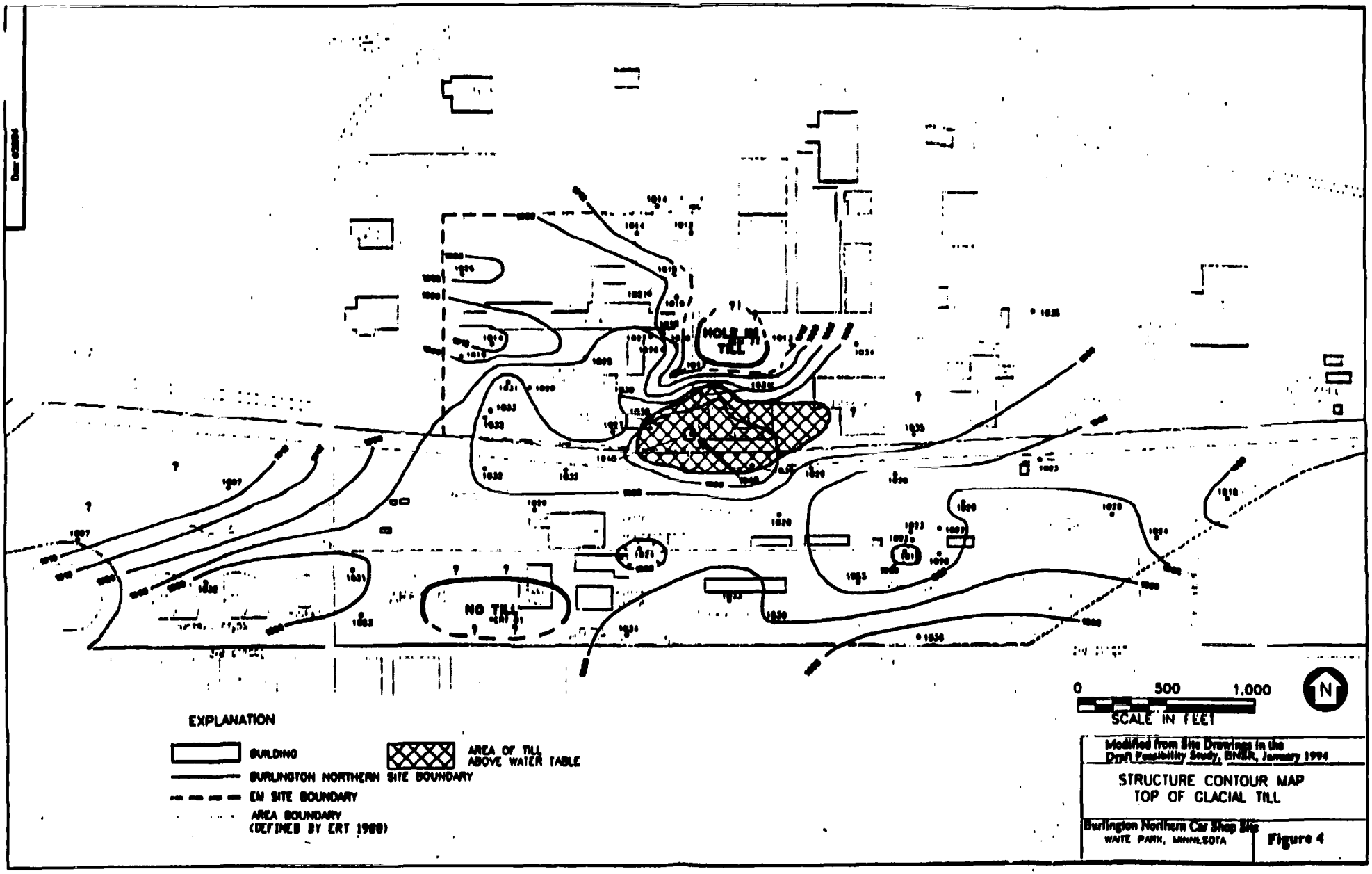
Modified from Site Drawings in the Draft Feasibility Study, ENSR, January 1994

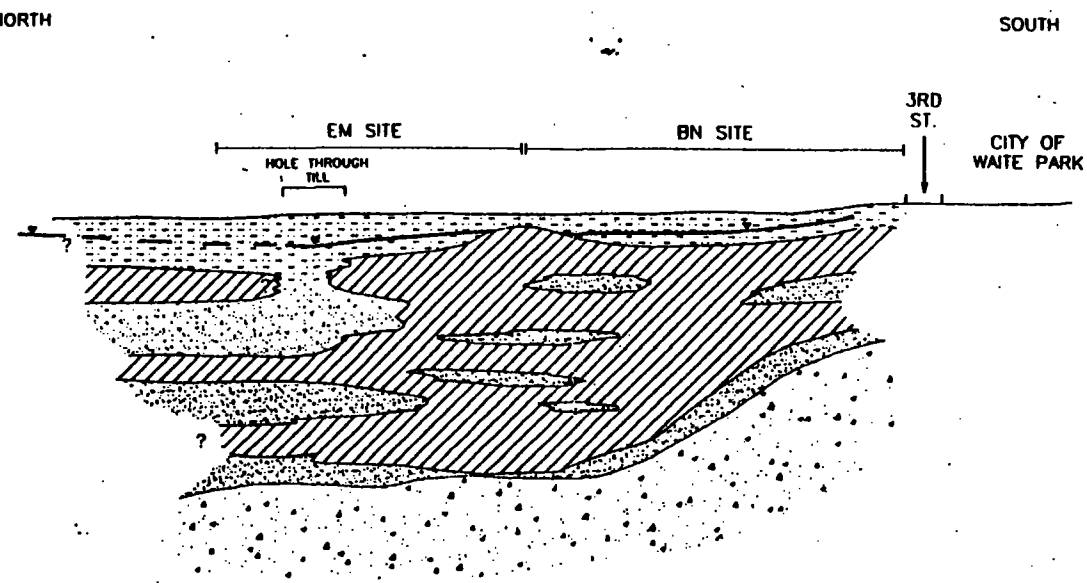
Figure 1
Site Location Map
Burlington Northern Car Shop Site
Waite Park, Minnesota

DRAWN:	DATE: 6/28/94	


AREA A
AREA B
AREA C
AREA D
AREA E
AREA F
AREA G
AREA H
MUNICIPAL WELL HOUSE
COUNTY MAINTENANCE FACILITY
3rd STREET
0
500
1,000
SCALE IN FEET
N
EXPLANATION
BUILDING
BURLINGTON NORTHERN SITE BOUNDARY
EM SITE BOUNDARY
AREA BOUNDARY (DEFINED BY ERT 1988)
BN PROPERTY BOUNDARY
OTHER PROPERTIES
Modified from Site Drawings in the Draft Feasibility Study, ENSR, January 1994
SITE FEATURES
Burlington Northern Car Shop Site
WAITE PARK, MINNESOTA
Figure 2

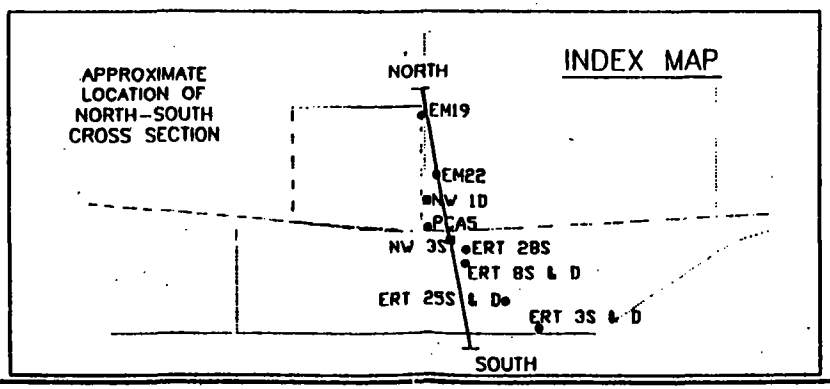

Paint Building
EXPLANATION
BUILDING
BURLINGTON NORTHERN SITE BOUNDARY
EM SITE BOUNDARY
AREA BOUNDARY
(DEFINED BY ERT 1988)
LEGEND
SULFUR- CONTAINING SOILS
Sandblast Sand
SHALLOW GROUNDWATER CONTAMINATION
LAGOONS
FENCE
NOTE:
CONTAMINATION RELATED TO FORMER UNDERGROUND STORAGE TANKS TO BE ADDRESSED UNDER MPCA'S UST PROGRAM.
0
500
1,000
SCALE IN FEET
N
Modified from Site Drawings in the Draft Feasibility Study, ENSR, January 1994
Areas of Concern to be Addressed by this ROD
Burlington Northern Car Shop Site
WAITE PARK, MINNESOTA
Figure 3


HOLE IN TILL
NO TILL
EXPLANATION
BUILDING
AREA OF TILL ABOVE WATER TABLE
BURLINGTON NORTHERN SITE BOUNDARY
EM SITE BOUNDARY
AREA BOUNDARY (DEFINED BY ERT 1988)
0
500
1,000
SCALE IN FEET
N
Modified from Site Drawings in the Draft Feasibility Study, BNSR, January 1994
STRUCTURE CONTOUR MAP
TOP OF GLACIAL TILL
Burlington Northern Car Shop Site
WAITE PARK, MINNESOTA
Figure 4



LEGEND

- ZONE A
- GLACIAL TILL
- ZONE B
- GRANITE



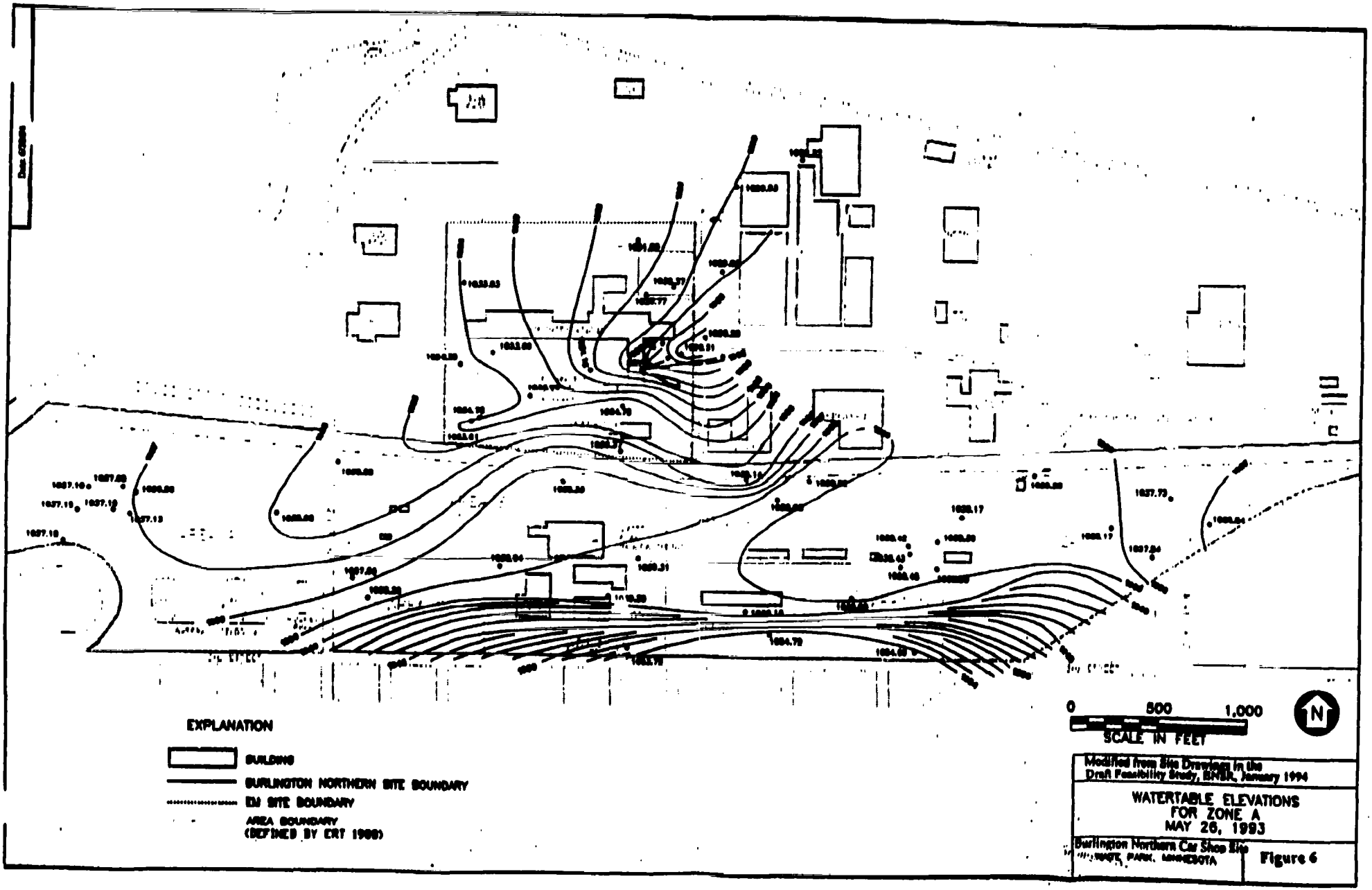
NOT TO SCALE

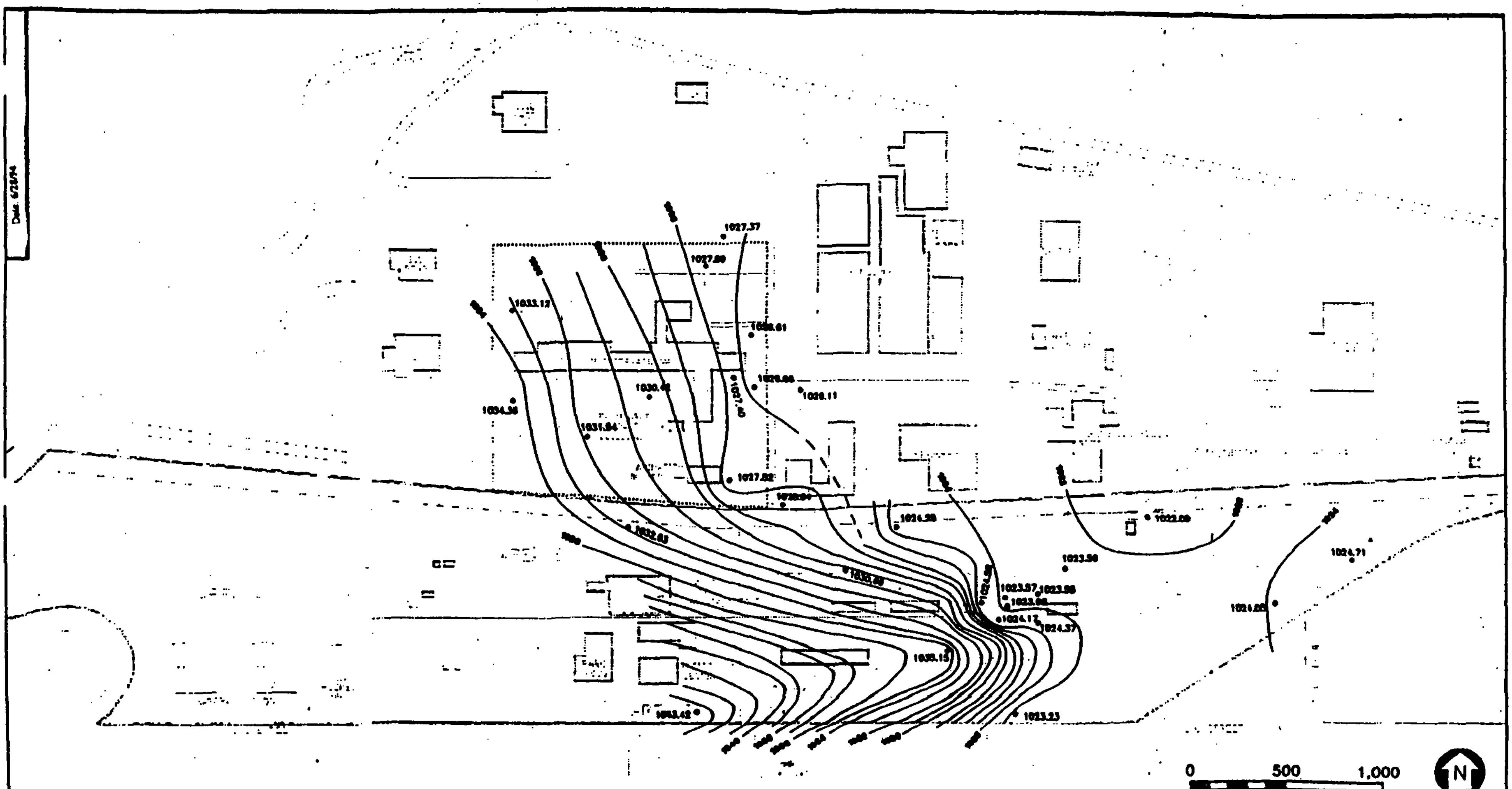
Modified from Site Drawings in the Draft Feasibility Study, ENSR, January 1994

CONCEPTUAL NORTH-SOUTH CROSS SECTION

Burlington Northern Car Shop Site
WAITE PARK, MINNESOTA

Figure 5


EXPLANATION
BUILDING
BURLINGTON NORTHERN SITE BOUNDARY
EM SITE BOUNDARY
AREA BOUNDARY
(DEFINED BY ERT 1988)
0
500
1,000
SCALE IN FEET
N
Modified from Site Drawings in the Draft Feasibility Study, ERNR, January 1994
WATERTABLE ELEVATIONS
FOR ZONE A
MAY 26, 1993
Burlington Northern Car Shop Site
Figure 6



Date 6/28/94

EXPLANATION

BUILDING

BURLINGTON NORTHERN SITE BOUNDARY

EM SITE BOUNDARY

AREA BOUNDARY
(DEFINED BY ERT 1988)

Modified from Site Drawings in the Draft Feasibility Study, ENSR, January 1994

POTENTIOMETRIC SURFACE
FOR ZONE B
MAY 26, 1993

Burlington Northern Car Shop Site
WAITE PARK, MINNESOTA

Figure 7

Tables

Soil Contaminants of Concern
Soil Remediation Levels
for Lagoons and Sandblast Sands
Burlington Northern Car Shop Site, Waite Park, Minnesota

Matrix/Compound	Concentrations Detected in the Soils (1)		Background (3)	Remediation Level (4)		Confirmation Sampling Methods
	Operable Unit 1 Lagoons	Operable Unit 2 Sandblast Sands (2)	Concentrations Surface Soils	Unrestricted Land Use	Commercial/ Industrial Land Use	
	min/max mg/kg	min/max mg/kg	min/max(avg) mg/kg	mg/kg	mg/kg	
Metals						
Arsenic (c)	0.6/42	0.53/18	1.2/5.7 (3.5)	10	20	6010/7060
Cadmium	0.9/4.9	0.5/2.8	ND	10	270	6010/7061
Lead	8.5/120,000	5.3/17,000	14/170 (38.5)	500	1000	6010/7062
Semi-Volatile Organic Compounds (SVOCs)						
Anthracene	NA	NA	0.065/1 (0.227)	NGA	NGA	8270
Benzo(ghi)perylene	NA	NA	ND	NGA	NGA	8270
Fluoranthene	NA	NA	0.094/4.6 (0.834)	NGA	NGA	8270
Fluorene	NA	NA	0.062/0.12 (0.033)	NGA	NGA	8270
Naphthalene	NA	NA	0.027/0.031 (0.011)	NGA	NGA	8270
Phenanthrene	NA	NA	0.058/3 (0.543)	NGA	NGA	8270
Pyrene	NA	NA	0.068/2.7 (0.499)	NGA	NGA	8270
total cPAHs (c)	NA	NA	ND/23 (4.0)	NGA	NGA	8270 mod
Polychlorinated Biphenols (PCBs)						
PCBs, total (c)	ND/570	NA	NA	1	4	8080

(1) Presents minimum and maximum numbers detected during investigative studies.

(2) Operable Unit 2 also includes the contaminated dirt floor of the Paint Building.

The minimum/maximum concentrations of lead detected in the soils from the dirt floor of the Paint Building are 900/26,000 mg/kg. The detected concentrations for TCLP soil analysis for lead is 4.9/9.9.

The minimum/maximum concentrations of cadmium detected in the dust samples from the Paint Building are ND/190 mg/kg. The detected concentrations for TCLP soil analysis for cadmium is <0.001.

(3) Represent Site-specific background concentrations developed during Site investigations.

(4) Unrestricted land use applies to Area A. Industrial land use applies to Areas B through H.

(c) = carcinogenic

ND = Not Detected

NA = Not Analyzed

NGA = No Goal Assigned. A goal was not assigned at this time do to lack of analysis. A goal may be assigned based on the results of confirmation sampling.

Table 2

7/11/94

Ground Water Contaminants of Concern
Ground Water Monitoring Requirements
Burlington Northern Car Shop Site, Waite Park, Minnesota

Matrix/Compound	Concentrations Detected in the Ground Water (1)			Minnesota Background Concentrations (2)	RAL (3)	MCL (4)	HRL (5)	Aquatic Life Stand. M.S. (6)	Ground Water Monitoring Methods
	Area A Lagoon min-max ug/l	Area C Lagoon min-max ug/l	Other min-max ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	
Metals									
Arsenic (c)	7.0/17	ND	ND	1 to 56	0.2	50 (7)		360	7060
Cadmium	ND	ND	ND	0.005 to 21	4	5	4	133	7131/6010
Lead	ND	31/31	ND	.1 to 1900	20	15		388	7421
Volatile Organic Compounds (VOCs)									
Tetrachloroethene (PCE)	1/1	ND	0.1/61	--	7	5		428	465D
Trichloroethene (TCE)	0.2/3.0	ND	0.1/100	--	30	5		6988	465D
Semi-Volatile Organic Compounds (SVOCs)									
Anthracene	ND	ND	0.15/19	--	2000		2000	1.6	8270
Fluoranthene	0.36/0.36	0.15/0.48	0.1/4.0	--	300			199	8270
Fluorene	ND	0.2/1.3	0.25/49	--	300				8270
Naphthalene	1.7/1.7	ND	0.7/740	--	30				8270
Phenanthrene	ND	0.42/1.4	0.27/40	--				59	8270
Pyrene	0.34/0.34	.34/2.2	0.15/14	--	200		200		8270
total cPAHs (c)	ND/3.2	ND/16.1	ND/73.8	--	0.03	0.3(BaP)			8270mod
total nPAHs	ND/5.8	ND/16.2	ND/1425	--	0.3				8270mod
Polychlorinated Biphenols (PCBs)									
PCBs, total (c)	ND/3.3	2.8/220	ND	--		0.5		2	8080

Footnotes:

(1) Where minimum and maximum numbers are the same, the compound was only detected once.

(2) Minnesota Background Concentrations from the Ambient Network, 1992, developed by the MPCA, GWSW Program Development Section.

(3) Minnesota Department of Health (MDH) Recommended Allowable Limits (RALs) for Drinking Water. RALs are health based and apply primarily to private water supplies, for which there are no standards regulating levels of drinking water contaminants.

(4) Maximum Contaminant Level. Maximum permissible level of a contaminant in water which is delivered to any user of a public water system. The MCLs may not be health based.

(5) Health Risk Limit numbers are applied to substances found to degrade Minnesota ground water. HRLs are health based and will supersede RALs where appropriate.

(6) Aquatic Life Standards, Maximum Standard, shall apply to the point where surface water meets ground water. For this Site, the ground water monitoring well closest to the Sauk river was chosen. A new well, installed at the point where ground water meets surface water, is an acceptable replacement.

(7) The MCL for Arsenic is 50 ug/l. According to Charles Abernathy, EPA, the 50 ug/l is based on an incorrect assumption of 900 ug/day dietary intake, the assumption should be 40 to 50 ug/day.

(c) = carcinogenic

ND = not detected

NA = not analyzed

(BaP) = Benzo (a)pyrene

Response Action Alternatives
Burlington Northern Car Shop Site
Waite Park, Minnesota

Area A and C Lagoons (OU1)	Sandblast Sands (OU2)
1A: No Action	2A: No Action
1B: In Place Containment	2B: Reuse as Road Base
1C: Solidification/On-Site Landfill	2C: Solidification/On-Site Landfill
1D: Solidification/Off-Site Landfill	2D: Solidification/Off-Site Landfill
1E: Soil Washing/Extraction	2E: Soil Washing/Extraction

Combined Alternatives Area A and C Lagoons/Sandblast Sands (OU1 and OU2)
A: No Action
B: In Place Containment of Lagoons and Reuse as Road Base/ Solidification and On-Site Containment of Sandblast Sands
C: Solidification/On-Site Landfill
D: Solidification/Off-Site Landfill
E: Soil Washing/Extraction

Soil Contaminants of Concern
Treated Soil Remediation Levels
for Containment Cell
Burlington Northern Car Shop Site
Waite Park, Minnesota

Matrix/Compound	Remediation Level mg/l	Confirmation Sampling Methods
Metals		
Arsenic (c)	5.0	EPA 1311/EPA1312
Cadmium	1.0	EPA 1311/EPA1312
Lead	5.0	EPA 1311/EPA1312
Semi-Volatile Organic Compounds (SVOCs)		
Anthracene	NGA	EPA 1311/8270
Benzo(ghi)perylene	NGA	EPA 1311/8270
Fluoranthene	NGA	EPA 1311/8270
Fluorene	NGA	EPA 1311/8270
Naphthalene	NGA	EPA 1311/8270
Phenanthrene	NGA	EPA 1311/8270
Pyrene	NGA	EPA 1311/8270
total nPAHs	NGA	EPA 1311/8270 mod
total cPAHs (c)	NGA	EPA 1311/8270 mod
Polychlorinated Biphenols (PCBs)		
PCBs, total (c)	50.0 mg/kg	8080

EPA 1311, TCLP = Toxicity Characteristic Leaching Procedure

EPA 1312 = Synthetic precipitation leach test for soils

(c) = carcinogenic

NGA = No Goal Assigned. A goal was not assigned at this time do to lack of analysis.
A goal may be assigned based on the results of confirmation sampling.

Nine Evaluation Criteria and Comparative Analysis Numerical Ranking Burlington Northern Car Shop Site, Waite Park, Minnesota

rankings in each category with 1(least satisfactory) to 5(most satisfactory)

Evaluation Criteria	C: Solidification/ On-Site Containment	D: Solidification/ Off-Site Landfill
Overall Protection of Human Health and the Environment	4	4
Compliance with ARARs		
Long-Term Effectiveness	4	4
Reduction of Toxicity, Mobility or Volume Through Treatment	3	3
Short-Term Risks	3	3
Implementability	4	4
Total Costs	4	3
State Acceptance	4	4
Community Acceptance	4	3
Totals	30	28

Appendices

Appendix I: Summary of Major Investigative Activities

Appendix II: Blood Lead Screening Results

Appendix III: Supporting Information for Remediation Levels

Appendix IV: Applicable or Relevant and Appropriate Requirements

Appendix V: Generic Request for Response Action Guidelines for Remedial Design/Response Action Plans

Appendix I

Summary of Major Investigative Activities

Summary of Major Investigative Activities
Burlington Northern Car Shop Site,
Waite Park, Minnesota

Limited Remedial Investigation; Minnesota Pollution Control Agency; February 1985

Remedial Investigation Report for the Burlington Northern Waite Park Site, Waite Park, Minnesota; Environmental Resources and Technology, Inc.; November 1986

Electromagnetic Investigation of Alleged Buried Tank Car Area, the Municipal Well Area, and the Calcium Hydroxide Disposal Area; Minnesota Department of Natural Resources; 1987

PCBs in Sauk River; Minnesota Department of Health; June 1988

Final Remedial Investigation Report for the Burlington Northern Site, Waite Park, Minnesota, Volume I and Volume II; Environmental Resources and Technology, Inc.; August 1988

Removal of Storage Tanks, St. Cloud Car Shop, Waite Park, Minnesota, Volume I and II; John Mathes and Associates; March 1989.

Analytical Report; Wadsworth/Alert Laboratories Inc.; October 10, 1989

Fourth Quarter 1989 Ground Water Monitoring and Sand Assessment, St. Cloud Car Shop, Waite Park, Minnesota; John Mathes and Associates; March 1990

Sand Accumulations and Metals Analysis, St. Cloud Car Shop Site, Waite Park, Minnesota; John Mathes and Associates; August 1990

Evaluation of Extent of Oily Soils in Area A, St. Cloud Car Shop, Waite Park, Minnesota; John Mathes and Associates; January 1991

Burlington Northern Railroad; John Mathes and Associates; July 19, 1991

Consolidation of Sandblast Sand Piles in Areas A, B, and H, St. Cloud Car Shop, Waite Park, Minnesota; Burlington Environmental Inc.; July 1992

March 1992 Ground Water Monitoring Summary Report, St. Cloud Car Shop, Waite Park, Minnesota; Burlington Environmental, Inc.; September 1992

September 1992 Ground Water Monitoring Summary Report, St. Cloud Car Shop, Waite Park, Minnesota; Burlington Environmental, Inc.; February 1993

Lead Initiative Summary Report, Waite Park Wells, Waite Park, Minnesota; Agency for Toxic Substances and Disease Registry; September 24, 1992

Tenth Avenue Expansion Investigation Report, Waite Park, Minnesota; ENSR Consulting and Engineering; August 1993

Public Health Assessment for the Waite Park Ground Water Contamination Site, Waite Park, Minnesota; Minnesota Department of Health; December 1, 1993

Soil Characterization Report, Burlington Northern Waite Park Site, Waite Park, Minnesota; ENSR Consulting and Engineering; March 1993

Response Action Objectives and Cleanup Goals; Minnesota Pollution Control Agency; 1992-1994

Draft Feasibility Study Car Shop Site, Waite Park, Minnesota; ENSR Consulting and Engineering; January 1994

Feasibility Study Cost Comparison; ENSR Consulting and Engineering; February 1994

Appendix II

Blood Lead Screening Results

Appendix II
Statistical results of the blood lead screening

Taken from the Agency for Toxic Substances and Disease Registry (ATSDR) Public Health Assessement for Waite Park Wells. December 1, 1993, prepared by the Minnesota Department of Health.

1. Total number of clients screened: 108

2. Number of males: 60 (56%)

3. Number of females 48 (44%)

4. Number of clients reporting symptoms: 47 (44%)

5. Number of persons using BN Site: 61 (56%)

6. Age: 10 years and younger : 34
   11-15 years: 17
   16-19 years: 6
   20-25 years: 6
   26-30 years: 5
   31+ years: 40

7. Number of persons with elevated blood level (>10 ug/dl): 0

8. Interpreter needed. 29

A comprehensive referrral and follow-up plan was followed by the Stearns County Community Health Services staff or contract staff hired for the lead testing program. Stearns Conty Community Health Services staff was available for follow-up discussions. Referral to physicians was not necessary since no one showed elevated blood lead levels.

Appendix III

Supporting Information for Remediation Levels

I N T E R O F F I C E M E M O R A N D U M

TO: BRENDA WINKLER

FROM: HELEN GOEDEN

RE: SOIL REFERENCE VALUES FOR DIRECT SOIL CONTACT (INCIDENTAL INGESTION AND DERMAL CONTACT)

DATE: August 18, 1993

==========

Based on the information supplied by Brenda and Andrew as well as information contained in the Human Health and Ecological Risk Assessment report prepared by ENSR and BN I have calculated direct contact (i.e. incidental ingestion and dermal contact) human health-based soil reference values for the following CPCs:

Arsenic
Cadmium
Chromium III
Chromium VI
Nickel
Lead
Carcinogenic PAHs
Noncarcinogenic PAHs
PCBs

NOTE: The evaluation for lead was conducted separately from the other contaminants. A blood lead level of less than 10 ug/dl for 95% of the exposed population was set as the health based target for children under the age of 6 years. Please keep in mind that a blood lead of 10 ug/dl does not reflect a no-effect level. A clear no-effect level has not been established for lead-related endpoints such as birth weight, gestation period, heme synthesis and neurobehavioral development in children and fetuses, and blood pressure in middle-aged men.

LAND USE SCENARIOS

Three land use scenarios were initially evaluated: 1) unrestricted future land use; 2) current and future recreational land use; and current and future commercial/industrial land use.

During subsequent discussions it was decided to utilize unrestricted future land use and commercial/industrial land use in the calculation of health-based soil reference values.

1) Unrestricted future land use
A residential exposure scenario is utilized as a surrogate land use in this evaluation, with the assumption that if it is safe for an individual to live on the site it will be safe for unrestricted human land use.

2) Current and Future Limited Land Use - Commercial/Industrial
Two receptors, a worker and a trespasser, were evaluated under this scenario. The current use and zoning of the site would allow for a variety of exposure levels. A commercial office worker would represent a low exposure scenario whereas an industrial worker with outdoor activities would represent a higher exposure scenario. Through discussions it was decided that since the current land use could include an industrial worker with outdoor activities this exposure scenario was utilized in calculating the health-based soil reference values.

A potential trespasser receptor was also evaluated since the site is accessible to trespassers and there is evidence that individuals do cross the site.

NOTE: EPA has also requested a construction worker scenario assessment. I have conducted a quick evaluation utilizing the incidental soil ingestion rate suggested by EPA (480 mg/d) and an exposure frequency of 5 days per week for a 9 month period. The results of this evaluation are presented at the end of this memo for comparison to the unrestricted and commercial/industrial land use based reference values.

EXPOSURE ASSUMPTIONS

Exposure Pathways -

1) Incidental soil and dust ingestion
Please note that the ingestion rate for incidental ingestion includes incidental ingestion of indoor dust and inhalation and subsequent ingestion of resuspended outdoor soil/dust and indoor dust. Therefore, an exposure frequency of 350 days/year was utilized.

2) Dermal Contact

Please note that I have not evaluated the inhalation pathway. If the potential for inhalation of particulate or vapor is of concern the following soil reference values may not be health protective, particularly for the contaminants which are much more toxic by inhalation than ingestion. This would include arsenic, cadmium, chromium VI, and nickel.

The following values should also be compared to the cleanup goals based on

potential leaching to ground water to make sure that the direct contact based values are adequately protective of ground water. Ecological concerns should also be examined, i.e. are the direct contact and ground water based values protective of ecological receptors?.

Exposure Assumptions -

Exposure assessment should be based on an estimate of the reasonable maximum exposure (RME) expected to occur under both current and future land-use conditions. The RME is defined as the highest exposure that is reasonably expected to occur at the site (RAGS 1989). Use of central tendency values for each parameter would produce a central value scenario which would underestimate exposure for a large portion of the population. Use of all upper bound or high end values for each parameter would produce an upper bound estimate that is usually above the high end of the population exposure distribution. A mix of upper bound and central values is probably the best way to create a RME scenario. A mix of central and upper bound values, combined with climatic considerations, were utilized to produce RME estimates for the BNWP site.

Since I am not as intimate with the site and the surrounding area as you are I have attached the exposure variable tables for your information. Please review the assumptions I have utilized in estimating the RME. Note, you will not be able to duplicate my values based on the exposure assumptions attached and available toxicity values. My calculations also include adjustments for differences in absorption efficiencies.

TARGET RISK VALUES

Carcinogens:
The cumulative target cancer risk applied in Minnesota has been 1E-5. In light of the uncertainty surrounding the incidence and level of contamination from organics I have calculated reference soil values which correspond to a cancer risk of 1E-5 for each contaminant. If multiple carcinogenic contaminants occur, the soil values need to be pro-rated downward so that the cumulative incremental cancer risk equals 1E-5.

Given current risk assessment methodology, direct dermal toxicity resulting from direct contact with PAHs, as opposed to systemic effects from absorbed PAHs, cannot be assessed. Although the potential dermal cancer risk from dermal contact with PAHs can not be quantified the potential risk should be considered in the final risk management decision and in setting cleanup levels.

Noncarcinogens:
The soil concentration corresponding to a hazard quotient (HQ) of 0.1

was determined based on noncarcinogenic effects. A HQ of 0.1 was utilized to account, in part, for other sources of exposure (e.g. air, food, water) and to reflect the level of certainty under which risk calculations for noncarcinogens are calculated. Utilizing a HQ of 1 for each chemical would not be health protective since it would allow the exposure from a single source (i.e. the site) to account for 100% of what is considered safe and does not account for the fact that there are multiple sources of exposure. The use of 0.1 for chemical specific HQ is also recommended by Region V (personal communication from Pat Van Leeuven). The cumulative HI should be < 1 for chemicals with similar toxic endpoints. The soil values may need to be pro-rated downward so that the cumulative HI for similar toxic endpoints is $\leq$ 1.

UNRESTRICTIVE FUTURE LAND USE

A residential exposure scenario is utilized as a surrogate land use in this evaluation, with the assumption that if it is safe for an individual to live on the site it will be safe for unrestricted human land use.

Contaminant	Reference Soil Con. (mg/kg)	HQ	Critical Noncancer Endpoint	Oral Cancer Risk
Metals:				
Arsenic	5	0.1	SKIN,CNS,CV	0.5E-5
Cadmium	17	0.1	KIDN	NA
Chromium III	12500	0.1	KIDN,LIV	NA
Chromium VI	83	0.1	" "	NA
Nickel	250	0.1	WHOLE BODY	NA
Lead	300 - 500			
Semi-volatiles				
cPAHs	1	NA		1E-5
acenaphthene	640	0.1	LIV	NA
acenaphthylene	640	0.1	LIV	NA
anthracene	3170	0.1	NA	NA
benz(ghi)perylene	320	0.1	KIDN	NA
fluoranthene	425	0.1	LIV,KIDN,BLD	NA
fluorene	425	0.1	BLD	NA
naphthalene	425	0.1	IMMUNE,LIV	NA
phenanthrene	3170	0.1	NA	NA
pyrene	320	0.1	KIDN	NA
PCBs	2	NA		1E-5

NA - not available
Endpoints:
CV/BLD - cardiovascular/blood system; CNS - central nervous system;
KIDN - kidney and renal system; LIV - liver; IMMUN - immune system;
REP - reproductive system including developmental

NOTE: Utilized RfD of acenaphthene for acenaphthylene
Utilized RfD of pyrene for Benz(ghi)perylene
Utilized RfD of anthracene for phenanthrene

Lead - 500 ppm (OSWER Memorandum, August 29, 1991), based on UBK model.
Note: Assumes exposure from air, diet, water, and leaded paint are at general background or are nonexistent:
Air - assumes air concentration of 0.2 ug Pb/m3
Water - assumes water concentration of 4 ug Pb/l
Diet - assumes approximately 6.5 ug Pb/day
Leaded Paint - assumes 0 ug Pb/day

If the contribution from "nonsoil" pathway(s) is or potentially is significantly greater than what is listed above the 500 ppm value may need to be decreased to offset the increased intake from other sources.

It is recommended that the cleanup goal for a residential setting be set at 300 - 500 ppm depending on the potential for exposure from "nonsoil" sources.

Unrestricted Future Land Use (Residential) Exposure Assumptions - Ingestion of chemicals in soil.

Intake (mg/kg-day) = (CsxIRxCFxFIxEFxED)/(BWxAT)

Variable	Definition	Value Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	0.8 Cs		adjusted for dust exposure only 5 mon/yr (assumed dust concentration = 0.5 soil concentration)
IR	Ingestion Rate (mg soil/day)	100 (< 6 yr)		
		50 (> 6 - 30 yr)	C	Davis et al, 1990; Calabrese and Stanek 1991
		60 (age-adjusted)		
CF	Conversion Factor (kg/mg)	1.00E-06		
FI	Fraction ingested from contaminated area	1.00	U	
EF	Exposure Frequency (day/yr)	350	U	Includes indoor dust and outdoor soil (EPA 1989a)
ED	Exposure duration (years)	6 (child < 6 yr)		
		24 (> 6 - 30 yr)	U	EPA 1989a
		30 (total duration)		
BW	Body weight (kg)	15 (child < 6 yr)	C	EPA 1989b
		57 (> 6 - 30 yr)	C	
		50 (age-adjusted)	C	
AT	Averaging Time (days)	2190 (child < 6 yr)		Noncancer Evaluation AT = exposure duration
		8760 (> 6 - 30 yr)		
		10950 (total duration)		
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available
C = Central Tendency Value
U = Upper Bound Value

Unrestrictive Future Land Use (Residential) Exposure Assumptions - Dermal contact with chemicals in soil.

Dose (mg/kg·day) = (Cs×CF×SA×AF×ABS×EF×ED)/(BW×AT)

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs		
CF	Conversion Factor (kg/mg)	1.00E-06		
SA	Skin surface area in contact with soil (cm2)	2000 (< 6 yr) 4100 (> 6 - 30 yr) 3680 (age-adjusted)	U/C U/C	25% (U) of ave total body surface area (C) (7,100 cm2 (<6 yr) and 16364 cm2 (> 6 yr) (EPA, 1992)
AF	Skin Adherence factor (mg/cm2)	0.6	M	between central tendency (0.2 mg/cm2) and upper bound value (1 mg/cm2) (EPA 1992)
ABS	Absorption factor	Chemical Specific		EPA 1992, Wester et al, and professional judgement
EF	Exposure Frequency (day/yr)	150 (< 6 yr) 100 (> 6 - 18 yr) 74 (>18 - 30 yr) 100 (age-adjusted)	U	Assumes dermal exposure negligible during 5 mons/yr (ave. 5 d/wk for 7 mons/yr) (5 d/wk for 3 mon + 2 d/wk for 4 mon) (3 d/wk for 3 mon + 2 d/wk for 4 mons)
ED	Exposure Duration (years)	6 (child < 6 yr) 24 (> 6 - 30 yr) 30 (total duration)	U	EPA 1989a
BW	Body Weight (kg)	15 (child < 6 yr) 57 (> 6 - 30 yr) 50 (age-adjusted)	C C C	EPA 1989b
AT	Averaging time (days)	2190 (child < 6 yr) 8760 (> 6 - 30 yr) 10950 (total duration) 25550		Noncancer Evaluation AT = exposure duration Cancer Evaluation AT = 70 year lifetime

NA = Not available
C = Central Tendency Value
U = Upper Bound Value
M = between Central Tendency and Upper Bound Values

LIMITED CURRENT USE - COMMERCIAL/INDUSTRIAL

Two receptors, a worker and a trespasser, were evaluated under this scenario. The current use and zoning of the site would allow for a variety of exposure levels. A commercial office worker would represent a low exposure scenario whereas an industrial worker with outdoor activities would represent a higher exposure scenario. Through discussions it was decided that since the current land use could include an industrial worker with outdoor activities this exposure scenario was utilized in calculating the health-based soil reference values.

A potential trespasser receptor was also evaluated since the site is accessible to trespassers and there is evidence that individuals do cross the site. A great deal of uncertainty is associated with the exposure assumptions since it is difficult to determine the frequency and extent of contact with the site.

The trespasser was assumed to be greater than 6 years of age. We requested that BN and ENSR in the baseline risk assessment to include children less than the age of 6 because of the potential for older siblings taking younger siblings with them. If it is likely that children younger than the age of 6 may trespass on a commercial site the following values may not be health protective.

Commercial/Industrial (cont)

Contaminant	Reference Soil Con (mg/kg)	Oral HQ	Cancer Risk
Metals:			
Arsenic	20(V)	0.1	1E-5
	40(T)	0.05	1E-5
Cadmium	136(V)	0.1	NA
	350(T)		
Chromium III	100000(V)	0.1	NA
	NCPC(T)		
Chromium VI	686(V)	0.1	NA
	1750(T)		
Nickel	2025(V)	0.1	NA
	3800(T)		
Lead	1000(V)		
	NA (T)		
Semi-volatiles:			
cPAHs	3(V)	NA	1E-5
	4(T)		
acenaphthene	5077(V)	0.1	NA
	8500(T)		
acenaphthylene	5077(V)	0.1	NA
	8500(T)		
anthracene	25700(V)	0.1	NA
	39000(T)		
benz(ghi)perylene	2570(V)	0.1	NA
	3900(T)		
fluoranthene	3385(V)	0.1	NA
	5200(T)		
fluorene	3385(V)	0.1	NA
	5200(T)		
naphthalene	3385(V)	0.1	NA
	5200(T)		
phenanthrene	25700(V)	0.1	NA
	39000(T)		
pyrene	2570(V)	0.1	NA
	3900(T)		
PCBs	4(V)	NA	1E-5
	8(T)		

(V) = industrial worker
(T) = trespasser

NOTE:

The above commercial/industrial setting does not address the potential existence of a day-care or preschool. It is not uncommon

for these facilities to exist in "mini-malls or strip malls". If current or future zoning would allow this type of facility some type of land use restriction is recommended.

Utilization of restricted land use based cleanup goals would require some type of institutional control in place to ensure that the land use remained restricted. **The proximity of residential land use should also be considered in the determination of appropriate cleanup goals.**

Lead: 1000 ppm value based on discussions with Region V Superfund personnel, Region V RCRA personnel, and Toxics Integration Branch (Washington D.C.) personnel. EPA has initiated research on adult sensitive receptors (e.g. middle-aged hypertensive men; pregnant women) however, it is not known at this time whether the proposed value is protective of these receptors. Note: contacts with RCRA indicate that for clean closure lead levels of 300 - 400 ppm have been utilized.
NOTE: this value may not be adequately protective of a child who frequently trespasses/visits the site.

LIMITED CURRENT LAND USE (INDUSTRIAL)

Limited Current Land Use (Industrial) Exposure Assumptions - Ingestion of chemicals in soil.

Intake (mg/kg-day) = (CsxIRxCFxFIxEFxED)/(BWxAT)

Variable	Definition	Value Utilized		Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	Cs	(Trespasser, > 6 yr)		Worker - Adjusted for indoor exposure during 5 mon/yr
		0.8 Cs	(Industrial Worker)		(assumed indoor dust concentration = 0.5 Cs)
IR	Ingestion Rate (mg soil/day)	50	(Trespasser, > 6 yr)	C	EPA 1989a
		80	(Industrial Worker)	NA	assumes 50 mgd for 5 mon and 100 mg/d for 7 mon
CF	Conversion Factor (kg/mg)	1.00E-06			
FI	Fraction Ingested from site	1		U	
EF	Exposure Frequency (day/yr)	75	(Trespasser, > 6 yr)	NA	Ave. 2.5 d/wk for 7 mon period
		250	(Industrial Worker)	U	EPA 1991 - includes indoor dust exposure
ED	Exposure Duration (yr)	30	(Trespasser, > 6 yr)	U	
		25	(Industrial Worker)	U	EPA 1991
BW	Body Weight (kg)	60	(Trespasser, > 6 yr)	C	EPA 1989b
		70	(Industrial Worker)	C	
AT	Averaging Time (days)	10950	(Trespasser, > 6 yr)		Noncancer Evaluation AT = ED
		9125	(Industrial Worker)		
		25550			Cancer Evaluation AT = 70 year lifetime

NA = not available
C = Central Tendency Value
M = Midpoint between Central Tendency and Upper Bound Values
U = Upper Bound Value

LIMITED CURRENT LAND USE (INDUSTRIAL)

Limited Current Land Use (Industrial) Exposure Assumptions - Dermal contact with chemicals in soil.

Dose (mg/kg-day) = (CsxCFxSAxAFxABSxEFxED)/(BWxAT)

Variable	Definition	Value Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	Cs		
CF	Conversion Factor (kg/mg)	1.00E-06		
SA	Surface area (cm2/event)	2500 (Trespasser)	C	15% of ave total body surface (16364 cm2) (10% - 2 mon period and 25% - 3 mon summer period)
		3000 (Industrial Worker)	C	15% of ave total body surface
AF	Adherence Factor (mg/cm2)	0.6	M	between central tendency value (0.2 mg/cm2) upper bound value (1 mg/cm2) (EPA 1992)
ABS	Absorption Factor	Chemical specific		EPA 1992, Wester et al., profess. judgement
EF	Exposure Frequency (day/yr)	55 (Trespasser)	NA	2.5 day/wk for 5 mon period (May - Sept)
		65 (Industrial Worker)		3 day/wk for 5 mon period (May - Sept)
ED	Exposure duration (yr)	30 (Trespasser)	U	EPA 1989a
		25 (Industrial Worker)	U	EPA 1991
BW	Body Weight (kg)	60 (Trespasser)	C	EPA 1989b
		70 (Industrial Worker)	C	
AT = Averaging Time (days)		10950 (Trespasser)		Noncancer evaluation AT = ED
		9125 (Industrial Worker)		
		25550		Cancer evaluation AT = 70 year lifetime

NA = Not Available

C = Central Tendency Value

M = Midpoint between Central Tendency and Upper Bound Values

U = Upper Bound Value

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LIMITED SHORT-TERM LAND USE - CONSTRUCTION

Region V EPA has requested a construction scenario evaluation to determine if the reference values would be adequately protective of construction workers who may have much higher incidental soil ingestion rates but shorter exposure duration. Since the exposure duration assumed was 9 months I have utilized the subchronic RfD values for the noncarcinogenic endpoints. Please note that a subchronic RfD did not exist for cadmium and therefore I was unable to calculate a reference value for this contaminant.

Contaminant	Reference Soil Con (mg/kg)	Oral Subchronic HQ	Cancer Risk
Metals:			
Arsenic	4	0.1	3.2E-7
Cadmium	No Toxicity Value		
Chromium III	10000	0.1	NA
Chromium VI	260	0.1	NA
Nickel	210	0.1	NA
Lead	NA		
Semi-volatiles:			
cPAHs	22	NA	1E-5
acenaphthene	5500	0.1	NA
acenaphthylene	5500	0.1	NA
anthracene	27200	0.1	NA
benz(ghi)perylene	2760	0.1	NA
fluoranthene	3600	0.1	NA
fluorene	3600	0.1	NA
naphthalene	360	0.1	NA
phenanthrene	27200	0.1	NA
pyrene	2760	0.1	NA
PCBs	30	NA	1E-5

LIMITED LAND USE - SHORT-TERM (CONSTRUCTION)

Limited Short-term Land Use (Construction) Exposure Assumptions - Ingestion of chemicals in soil.

Intake (mg/kg-day) = (CsxIRxCFxFIxEFxED)/(BWxAT)

Variable	Definition	Value Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	Cs		
IR	Ingestion Rate (mg soil/day)	480	U	EPA 1989a
CF	Conversion Factor (kg/mg)	1.00E-06		
FI	Fraction ingested from site	1	U	
EF	Exposure Frequency (day/yr)	196	NA	5 day/week for 9 mon/yr
ED	Exposure Duration (yr)	0.75		9 mon/yr
BW	Body Weight (kg)	70	C	EPA 1989b
AT	Averaging Time (days)	196		Noncancer Evaluation AT = ED
		25550		Cancer Evaluation AT = 70 year lifetime

NA = not available

C = Central Tendency Value

U = Upper Bound Value

M = Midpoint between Central Tendency and Upper Bound Values

LIMITED LAND USE - SHORT-TERM (CONSTRUCTION)

Limited Short-term Land Use (Construction) Exposure Assumptions - Dermal contact with chemicals in soil.

Dose (mg/kg-day) = (CsxCFxSAxAFxABSxEFxEDI/BWxAT)

Variable	Definition	Value Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	Cs		
CF	Conversion Factor (kg/mg)	1.00E-06		
SA	Surface area (cm2/event)	3000	C	15% of ave total body surface
AF	Adherence Factor (mg/cm2)	0.6	M	between central tendency value (0.2 mg/cm2) upper bound value (1 mg/cm2) (EPA 1992)
ABS	Absorption Factor	Chemical specific		EPA 1992, Wester et al., profess. judgement
EF	Exposure Frequency (day/yr)	196	NA	5 day/week for 9 mon/yr
ED	Exposure duration (yr)	0.75		
BW	Body Weight (kg)	70	C	EPA 1989b
AT = Averaging Time (days)		196		Noncancer evaluation AT = ED
		25550		Cancer evaluation AT = 70 year lifetime

NA = Not Available
C = Central Tendency Value
M = Midpoint between Central Tendency and Upper Bound Values
U = Upper Bound Value

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Appendix IV

Applicable or Relevant and Appropriate Requirements

Appendix IV
Applicable or Relevant and Appropriate Requirements

State ARARs.

Minnesota Statues.

- Minn. Stat. §115B (1992). The Minnesota Environmental Response and Liability Act (MERLA) identifies remedial actions as response to a release to the environment and states that such actions be "consistent with a permanent remedy taken... to prevent, minimize, or eliminate the release in order to protect the public health or welfare or the environment" (Minn. Stat. § 115B.02, subd. 16). Burlington Northern Railroad Company (BN) has been identified as the Responsible Party (Minn. Stat. § 115B.03) for the releases on the Burlington Northern Car Shop site (Site). *Therefore, BN is responsible for completing remedial actions in order to protect the public health* or welfare or the environment.

- Minn. Stat. § 115.061 (1992). The Minnesota Water Pollution Control Act provides for protection of the waters of the state by requiring the responsible person to "recover as rapidly and as thoroughly as possible such substance or material and take immediately such other action as may be reasonably possible to minimize or abate pollution of waters of the state caused thereby "

- Minn. Stat. § 115.03 (1992). MPCA may require and enforce a permit for any discharge to the waters of the state . Discharge of extracted waters shall be conducted in accordance with a National Pollutant Discharge Elimination System (NPDES) permit if it is discharged to the Sauk River via a storm sewer. Discharge of extracted waters to the MWCC sanitary sewer system for final treatment shall be subject to the discretion and approval of MWCC, which must adhere to Minnesota statutes and rules for discharge to the Mississippi River.

- Minn. Stat. § 144.98. Applies to the Minnesota Department of Health authority to certify environmental laboratories.

Minnesota Rules.

- Minn. Rules ch. 4717. Health Risk Limits (HRLs) are promulgated by the MDH as Minn. Rules pts. 4717.7100 to 4717.7800. HRLs are applicable to ground water cleanup and are based on the risk associated with ingestion of water from a private well. HRLs replace Recommended Allowable Limits for Drinking Water (RALs) where both exist for a contaminant as HRLs are based on more recent risk information and are promulgated. Also, HRLs, at present, are based only on risk data available in the Integrated Risk Information System (IRIS) data base. The shallow aquifer is hydraulically connected to the deep aquifer where the City municipal wells are located. Therefore, the shallow ground water may be considered a drinking water source. Although ground water remediation is not part of the remedial action at this time, ground water monitoring is a requirement and HRLs will be used to determine if ground water remediation is necessary.

- Minn. Rules ch. 7007 and 7009. Air Emissions and Ambient Air Quality Standards apply during excavation, treatment and construction activities.

- Minn. Rules ch 7011. Odorous emissions, petroleum and volatile organic compound storage vessels apply during excavation, treatment and construction activities.

- Minn Rules ch 7030 Noise Emissions. This rule applies during excavation, treatment and construction activities.

- Minn. Rule ch 7035. Solid Waste Management Rule pt 7035.2815 applies to the construction and monitoring requirements of an on-Site containment facility. A contingency action plan and post closure requirements shall be conducted in accordance with Minn. Rule pts. 7035.2615, 7035.2645, and 7035.2655, subd 1.

- Minn. Rule 7045. Applies to listed and characteristically hazardous waste. If a waste exhibits, on analysis, any of the characteristics of a hazardous waste, such as ignitability, corrosivity, reactivity, toxicity, or Minnesota lethality, or is an oxidizer as defined in Minn. Rules pt. 7045.031 it is considered a characterstically hazardous waste. Waste materials on the Site do meet the toxicity requirements and therefore is considered a characteristically hazardous waste.

- Minn Rule ch. 7050. Standards for water classifies surface waters of the state and provides water quality standards for these classified waters. Water quality standards are to be obtained if extracted ground water is discharged to the Sauk River. Additionally, direct discharge via storm sewer shall be regulated under an NPDES permit. Discharge to the sanitary sewer system will require that pretreatment standards prior to discharge to ensure that final treatment is compatible with the discharge standards

- Minn. Rules ch. 7060 (1991). Under its broad statutory authority to protect the quality of water of the state, the MPCA has adopted general policies and standards for the protection of ground water from pollution under Minn. Rules ch. 7060, which were promulgated "to preserve and protect the underground water of the state by preventing any new pollution and abating existing pollution" (Minn. Rules pt. 7060.0100). Minn. Rules pt. 7060.0200 states, "It is the policy of the agency to consider the actual or potential use of the underground waters for potable water supply as constituting the highest priority use and as such to provide maximum protection to all underground waters. The ready availability nearly statewide of underground water constitutes a natural resource of immeasurable value which must be protected as nearly as possible in its natural condition. For the conservation of underground water supplies for present and future generations and prevention of possible health hazards, it is necessary and proper that the agency employ a nondegradation policy to prevent pollution to the underground waters of the state."

  Minn. Rules pt. 7060.0400 provides that "all underground waters are best classified for use as potable water supply in order to preserve high quality waters by minimizing spreading of pollutants, by prohibiting further discharges of wastes thereto, and to maximize the possibility of rehabilitating degraded waters for their priority use." Minn. Rules pt. 7060.0600 provides standards relevant to contamination of the saturated and unsaturated zones. Subpart 1 prohibits discharge of pollutants to the saturated zone and Subpart 2 prohibits the discharge of pollutants to the unsaturated zone. Subpart 2 states that, "No sewage, industrial waste, other waste, or other pollutants shall be allowed to be discharged to the unsaturated zone or deposited in such place, manner, or quantity that the effluent or residue therefrom, upon reaching the water table, may actually or potentially preclude or limit the use of the underground water as a potable water supply, nor shall any such discharge or deposit be allowed which may pollute the underground waters." Finally, Subpart 3 provides that, "Treatment, safeguards, or other control measures shall be provided by the person responsible for any sewage, industrial waste, other waste, or other pollutants which are to be or have been discharged to the unsaturated zone or deposited there, or

which have been discharged to the zone of saturation. to the extent necessary to ensure that the same will not constitute or continue to be a source of pollution of the underground waters or impair the natural quality thereof."

- Minn Rules ch. 4725. The Water Well Code provides standards for the construction. maintenance and sealing of wells. environmental boreholes and exploratory borings.

- Minn. Rule 4740. Applies to the certification procedures and standards for laboratories.

- Minn. Rule 5205. Health and safety standards for worker health and safety and training as defined by the Minnesota Department of Labor and Industry.

Federal ARARs.

- Comprehensive Environmental Response. Compensation. and Liability Act (CERCLA) was amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), which added Section 121 to CERCLA. which provides some specific cleanup requirements. Among the changes is the preference for permanence in selecting a remedy and the use of applicable or relevant and appropriate requirements. The NCP implements the requirements of CERCLA Section 121 for using ARARs. as well as other standards and criteria. to guide cleanup decisions at Superfund Sites where EPA or the state under a cooperative agreement with EPA exercises cleanup authority.

  The NCP defines the "relevant and appropriate requirements" portion of the ARARs as being "those cleanup standards. standards of control. and other substantive requirements. criteria. or limitations promulgated under federal environmental or state environment or facility citing laws that. while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location. or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirement may be relevant and appropriate" (40 CFR 300.5 [1990]).

- 40 CFR 258. Post closure care and monitoring must continued for 30 years unless a decrease period can be approved by the MPCA.

- Safe Drinking Water Act. National Primary Drinking Water Standards (40 CFR part 141-143) Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) are health and treatment based numbers for regulating public water supplies. Although the shallow aquifer is not used for a drinking water supply, it is hydraulically connected to the deep aquifer. In addition. although ground water remediation is not part of the remedial action at this time, ground water monitoring is a requirement and the MCLs and MCLGs will be used in evaluating whether ground water remediation is necessary.

- Clean Water Act Water. Water Quality Criteria (40 CFR Part 131 Quality Criteria for Water 1976, 1980, 1986) are to be attained if ground water remediation is necessary and treated ground water is discharged to the Sauk River.

  Toxic Pollutant Effluent Standards (40 CFR Part 129) Effluent standards are to be attained for PCBs if treated ground water is discharged to the Sauk River.

- The Resource Conservation and Recovery Act (RCRA), passed in 1976 and amended by the Hazardous and Solid Waste Amendments in 1984, is an amendment to the Solid Waste Disposal Act of 1965, and is intended to ensure that solid wastes are managed in an environmentally sound manner. The objectives of RCRA are to protect human health and the environment, reduce waste and conserve energy and natural resources, and reduce or eliminate the generation of hazardous waste as expeditiously as possible.

  Identification and Listing of Hazardous Waste (40 CFR Part 261), defines solid wastes which are subject to regulation as hazardous waste under 40 CFR Parts 262-265 and Parts 124, 270, and 271.

  Subtitle C of RCRA establishes Land Disposal Restrictions (LDRs) (40 CFR Part 268), which restrict the land disposal of RCRA hazardous wastes, and would apply to the characteristic hazardous waste or medium that is moved off-Site for treatment, disposal, or storage. The waste generated at the Site contains lead and PCBs at levels considered characteristically hazardous. Subtitle C also allows the use of Corrective Action Management Units (CAMUs) to be implemented for a response action that formerly would have been restricted by LDRs (40 CFR Parts 260, 264, 268, 270, and 271).

  Ground Water Monitoring Response Requirements (40 CFR 264.94), regulate the concentration of a compound that may not exceed background, or standards for 14 toxic compounds or an alternate level and will be applied to determine if ground water remediation is necessary.

- Clean Air Act. National Primary and Secondary Ambient Air Quality Standards (40 CFR Part 50), establishes standards to ambient air quality to protect public health and welfare including standards for particulate matter and lead. Fugitive dust emissions from any excavation, construction or treatment must not exceed NAAQS requirements for particulate matter or lead.

<u>To Be Considered</u>

- RALs. The RALs, Minnesota Department of Health (MDH), Release No. 3, January 1991, are not promulgated standards and, therefore, are not considered ARARs. However, the RALs may be included in the category of "to be considered" guidance. This category includes criteria, advisories, and proposed standards issued by federal or state governments that are relevant because they address circumstances sufficiently similar to those at this Site and their application is well suited in determining whether response actions are reasonable and necessary to protect the public health and welfare, or the environment. RALs use information from the IRIS and HEAST data bases as well as other references and are used for determining the risk associated with ingestion of water from a private well. Although ground water remediation is not part of the remedial action at this time, ground water monitoring is a requirement to determine if ground water remediation is necessary. Water quality cleanup levels if necessary will be consistent with MCLs and HRLs/RALs, whichever is lower for a specific contaminant.

- 10-5 Risk Level. Unpublished September 1985 Minnesota Department of Health Report on tolerable risk levels/exposures

Appendix V

Generic Request for Response Action Guidelines for Remedial Design/Response Action Plans

EXHIBIT B
Table of Contents

Exhibit B

REMEDIAL DESIGN AND RESPONSE ACTION IMPLEMENTATION

I. INTRODUCTION

Part II.B. of the Request for Response Action (RFRA), to which this Exhibit is appended, requests the Responsible Party (RP) to prepare a Remedial Design/Response Action Plan (RD/RA Plan) and implement Response Actions (RAs) at the Site. This Exhibit sets forth the requirements for preparing the RD/RA Plan and implementing the RAs, which have been selected by the Minnesota Pollution Control Agency (MPCA) Commissioner pursuant to Part IV.D. of Exhibit A to the RFRA, and is appended to and made an integral part of the RFRA.

II. RETAIN CONSULTANT

The RP shall retain a consultant qualified to undertake and complete the requirements of this Exhibit. If the RP retains the same consultant used to complete Exhibit A to the RFRA, the RP shall proceed immediately with preparation of the RD/RA Plan. If the RP chooses to retain a different consultant, the RP shall retain the consultant and notify the MPCA project manager of the name of that consultant within thirty (30) days of notification of approval of the FS Report by the MPCA Commissioner.

III. REMEDIAL DESIGN/RESPONSE ACTION PLAN

III.A. RD/RA Plan Submittal

Within sixty (60) days of notification of approval of the FS Report by the MPCA Commissioner, the RP shall prepare and submit to the MPCA Commissioner for review and approval a RD/RA Plan which shall be based on the approved RI/FS reports and the Record of Decision (ROD) issued by the MPCA Commissioner under Exhibit A to the RFRA.

III.B. RD/RA Plan Contents

The purpose of the RD/RA Plan is to provide a detailed design, an implementation schedule, and a monitoring plan for the RAs specified in the ROD which, upon implementation, will protect the public health and welfare, and the environment from the release or threatened release of hazardous substances, pollutants or contaminants, at or from the Site.

The RD/RA Plan shall set forth in detail the steps necessary to implement the Site remedy specified in ROD. The RD/RA Plan shall include a restatement of the response action objectives and cleanup levels specified in the ROD. The RD/RA Plan shall include, at a minimum, the following:

III.B.1. Remedial Design. The purpose of the remedial design is to specify detailed methods and time schedules for the implementation of the RAs specified in the ROD. This section shall include, at a minimum, the following elements:

- design criteria and rationale;
- a plan view drawing of the overall Site, showing general locations for response action components;
- technical and operational plans and engineering designs for implementation of the response action including plan and cross sectional views for the individual components to be installed or actions to be implemented;
- a description of the types of equipment to be employed, including capacity, size, and materials or construction;
- an operational description of process units or other RA components;
- process flow sheets, including process material (e.g., chemical or activated carbon) consumption rates, and a description of the process;
- a discussion of potential construction problems and respective contingency plans;
- a schedule for implementing the construction phase;
- a Site-specific hazardous waste transportation plan (if necessary);
- the identity of all contractors, transporters, or other persons conducting removal or response actions at the Site;
- a description of any permits or licenses required to implement the RA;
- a description of the post RA operation and maintenance procedures and schedules; and
- a description of activities to be undertaken by the RPs during RA implementation to fulfill the requirements of Part III, Sections C.1. (Project Management), C.3. (Sampling and Investigations), C.5. (Record Retention), C.8. (Site Security and Safety Plan), and C.9. (Community Relations) of Exhibit A to the RFRA as they pertain to the removal or response actions and operation and maintenance activities.

III.B.2. RA Monitoring Plan. The RD/RA Plan, shall propose an RA monitoring plan for the Site. The purpose of post RA implementation monitoring is to determine the status and effectiveness of the implemented RAs. The RA monitoring plan shall, at a minimum, contain the following in order to determine that the cleanup levels specified in the ROD are achieved:

III.B.2.a. Environmental Media and Analytical Parameter List. The environmental media (soil, ground water, surface water and air) and a corresponding list of analytes to be monitored shall be proposed, along with the selection rationale, and a corresponding list of chemical analytical methodologies (including EPA or Standard Method numbers and detection limits) to be performed.

III.B.2.b. Monitoring Facility Location and Design. The design and location of all monitoring facilities/locations shall be proposed.

III.B.2.c. Sampling Schedule. A sampling schedule for the analytical parameters proposed in the RA monitoring plan for all monitoring locations shall be proposed. Sampling shall, at a minimum, be conducted on a quarterly basis.

III.B.2.d. Reporting Plan. A schedule for reporting the results of long-term monitoring to the MPCA shall be proposed. The schedule shall, at a minimum, contain the following:

1. Quarterly Monitoring Reports. The RP shall submit analytical results to the MPCA Commissioner quarterly by [specify date] following the sampling completed during the previous quarter.

2. Annual Monitoring Reports. The RP shall submit an Annual Monitoring Report to the MPCA Commissioner on or before January 1, [year] and each January 1 thereafter. Any remedial technology employed in implementation of the RD/RA Plan shall be left in place and operated by the RP until the MPCA Commissioner authorizes the RP in writing to discontinue, move, or modify some or all of the remedial technology. The RP may request discontinuation of the remedial technologies in the annual report, when the cleanup levels set forth in the ROD have been achieved. The RP shall move or modify the remedial technology when the movement or modifications, as approved by the MPCA Commissioner, may better achieve the remedial action objectives set forth in the ROD.

The Annual Monitoring Report shall contain the following:

- a Site map showing all monitoring locations;
- the results of all parameter analyses for the previous year;
- the results of all water level measurements for the previous year;
- regional and Site specific ground water piezometric maps for each aquifer including surface water elevations;
- cross section(s) indicating relative communication between aquifers;
- a map for each sampling event showing each monitoring location with contaminant concentrations and isoconcentration lines for selected parameters;

- graphs and tables illustrating the concentrations over time using data from each sampling event (these graphs and tables shall be cumulative showing parameter analyses for all previous years as well as the reporting year); and

- a sampling plan for the next year with an assessment of the monitoring parameters, sampling frequencies, and the need for the addition or deletion of monitoring locations and parameters.

III.C. RD/RA Plan Implementation

Within thirty (30) days of the MPCA Commissioner approval of the RD/RA plan, the RP shall initiate the RA. The purpose of RA implementation is to take those actions which will protect the public health and welfare, and the environment from the release or threatened release of hazardous substances or pollutants or contaminants at or from the Site.

The RD/RA Plan, as approved or modified by the MPCA Commissioner shall be implemented in accordance with the time schedules set forth in Part III of the RFRA and Part III.B. of this Exhibit. The implementation of RAs shall be conducted in accordance with all applicable federal and state ARARs, and local laws, rules, regulations, and ordinances.

During implementation of the RD/RA Plan, the MPCA Commissioner may specify such additions and/or revisions to the RD/RA Plan as the Commissioner deems necessary to protect public health and welfare, and the environment.

III.D. RA Implementation Report

Within sixty (60) days of the completion of implementation of the RAs specified in the approved RD/RA Plan, a RA Implementation Report which includes the following elements, shall be submitted to the MPCA Commissioner:

- the data and results of the RA implementation;

- the follow-up actions, if any, to be taken in the following one year period;

- a certification that all work plans, specifications, and schedules have been implemented and completed in accordance with the RD/RA Plan as approved or modified by the MPCA Commissioner;

- discussion of difficulties encountered during the implementation that may alter and/or impair or otherwise reduce the effectiveness of the RA implementation to prevent, eliminate, or minimize the release or threatened release of hazardous substances or pollutants or contaminants, at or from the Site, or which may require unanticipated operational or maintenance actions to maintain the effectiveness of any of the implemented RAs; and

- a discussion of any necessary modifications to the operation and maintenance procedures as approved.

IV. REPORT ON COMPLETION OF RA

Within sixty (60) days of notification, by the MPCA Commissioner, that all Site-specific Response Action Objectives and Cleanup Levels (Exhibit A, Part IV.A.) have been met, a Report on Completion of RA, which includes the following elements, shall be submitted to the MPCA Commissioner.

- a summary of the response action objectives and cleanup levels and a history of how they were met;
- certification that all RAs have been properly dismantled, including supporting documentation (e.g., monitoring well abandonment logs);
- a summary of any ongoing institutional controls (e.g., deed restrictions);
- a final cost summary.

V. MPCA COMMISSIONER ACTIONS

The RP shall submit to the MPCA Commissioner all plans, reports, or other documents (submittals) required by this Exhibit. The review and approval, approval with modifications and/or a request for additional information, or rejection of submittals shall be in accordance with this section and Part IV of the RFRA. The Site Safety and Security Plan does not require MPCA Commissioner approval.

V.A. Approval Of The RD/RA Plan, RA Implementation Report, And Report On Completion Of RA

The MPCA Commissioner shall review and approve, approve with modifications and/or a request for additional information, or reject the RD/RA Plan, RA Implementation Report, and the Report on Completion of RA based on the requirements of Parts III.B, III.D, and IV respectively. Modifications by the MPCA Commissioner are final.

If the MPCA Commissioner approves the RD/RA Plan, RA Implementation Report, or the Report on Completion of RA with a requirement to provide additional information, the Commissioner will: 1) specify the deficiencies in the RD/RA Plan, RA Implementation Report, or the Report on Completion of RA that necessitate the need for additional information; 2) provide direction to address the deficiencies; 3) specify the manner in which the RP shall document or otherwise convey the additional information; and 4) specify the time frame for submission or conveyance of the requested additional information.

If the MPCA Commissioner rejects the RD/RA Plan, RA Implementation Report, or the Report on Completion of RA, the Commissioner will: 1) specify the deficiencies in the RD/RA Plan, RA Implementation Report, or Completion of RA Report that necessitate the rejection; 2) provide direction to address the deficiencies; 3) specify the manner in which the RP shall document or otherwise convey the information necessary to correct the deficiencies; and 4) specify the time frame for submission or conveyance of the information necessary to correct the deficiencies.

Minnesota Pollution Control Agency

July 20, 1994

Mr. Mark Stromberg,
Remedial Technologies, Inc.
8700 Monrovia, Ste. 300
Lenexz, Kansas 66215

RE: Re: Record of Decision for the Burlington Northern Car Shop, Waite Park, Minnesota.

Dear Mr. Stromberg:

Enclosed is a copy of the Record of Decision (ROD) for the Burlington Northern Car Shop site (Site), Waite Park, Minnesota. This ROD presents the selected remedial action for lagoon waste and sandblast sand remediation and the ground water monitoring at the Site. The ROD was developed in accordance with Minnesota Pollution Control Agency October 22, 1985, Request for Response Action, the Minnesota Environmental Response and Liability Act, Comprehensive Environmental Response, Compensation, and Liability Act. (CERCLA), as amended by the Superfund Amendments Reauthorization Act and, to the extent practicable, the National Contingency Plan.

The MPCA staff has reviewed and is reviewing the June 1994, Design Report and Specifications. The MPCA staff will provide Burlington Northern Railroad Company (BN) with their comments to the Design Report and Specifications by July 22, 1994. It is our understanding that BN has already began treatability studies on the waste. The MPCA staff request BN to submit their treatability study work plan by July 25, 1994. BN shall also submit a proposed schedule for implementation of the ROD by July 25, 1994.

520 Lafayette Rd. N.; St. Paul, MN 55155-4194; (612) 296-6300 (voice); (612) 282-5332 (TTY)
Regional Offices: Duluth • Brainerd • Detroit Lakes • Marshall • Rochester

The MPCA staff look forward to the timely completions of the constructions of the remedy and your continued cooperation. If you have any questions regarding this letter or the enclosed ROD please contact me at (612) 296-7813.

Sincerely,

Brenda L. Winkler, Project Manager
Responsible Party Unit 1
Site Response Section
Ground Water and Solid Waste Division

enclosure

cc: Joe Aiken, ENSR Consulting and Engineering, Ft. Collins, Colorado
Sheila Sullivan, U. S. Environmental Protection Agency
Steve Poissant, Waite Park City Council
Mayor Al Ringsmuth, City of Waite Park
Doug Connell, Barr Engineering
John Knoepfler, Robins, Kaplan, Miller & Ciresi
Alan Williams, Attorney General's Office
James Brandt, Waite Park Manufacturing, Inc.
Katherine Carlson, Public Information Office